

# **ENVIRONMENTAL ASSESSMENT**

Reducing Mammal Damage  
through an  
Integrated Wildlife Damage Management Program  
in the  
State of New Jersey

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## TABLE OF CONTENTS

Summary of Proposed Action .....	vi
Acronyms .....	vii
 <b>CHAPTER 1: PURPOSE AND NEED FOR ACTION</b>	
1.0 INTRODUCTION .....	1
1.1 AUTHORITY AND COMPLIANCE .....	2
1.1.1 Wildlife Services Legislative Authority .....	2
1.1.2 New Jersey Department of Agriculture (NJDA) .....	3
1.1.3 New Jersey Department of Environmental Protection, Division of Fish and Wildlife (NJDFW) .....	3
1.1.4 New Jersey Department of Environmental Protection, Pesticide Control Program (NJPCP) .....	5
1.1.5 New Jersey Department of Health and Senior Services (NJDH) .....	5
1.1.6 New Jersey Agricultural Experiment Station, Cook College, Rutgers University .....	5
1.1.7 U.S. Fish and Wildlife Service (USFWS) .....	5
1.1.8 Compliance with Federal and State Statutes .....	6
1.2 SCOPE AND PURPOSE OF THIS EA .....	11
1.3 NEED FOR ACTION .....	12
1.3.1 Need for Mammal Damage Management to Protect Human Health and Safety .....	12
1.3.2 Need for Mammal Damage Management to Protect Agricultural Resources .....	18
1.3.3 Need for Mammal Damage Management to Protect Property .....	20
1.3.4 Need for Mammal Damage Management to Protect Natural Resources .....	21
1.4 RELATIONSHIP TO OTHER ENVIRONMENTAL DOCUMENTS .....	23
1.5 WS RECORD KEEPING REGARDING REQUESTS FOR MAMMAL DAMAGE MANAGEMENT ASSISTANCE .....	23
1.6 PROPOSED ACTION .....	24
1.7 DECISION TO BE MADE .....	24
1.8 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT ANALYSIS .....	25
1.8.1 Actions Analyzed .....	25
1.8.2 American Indian Lands and Tribes .....	25
1.8.3 Period for which this EA is Valid .....	25
1.8.4 Site Specificity .....	25
1.8.5 Summary of Public Involvement .....	26
1.9 PREVIEW OF THE REMAINDER OF THIS EA .....	26
 <b>CHAPTER 2: ISSUES AND AFFECTED ENVIRONMENT</b>	
2.0 INTRODUCTION .....	27
2.1 AFFECTED ENVIRONMENT .....	27
2.2 ISSUES ANALYZED IN DETAIL IN CHAPTER 4 .....	27
2.2.1 Effects on Target Mammal Species .....	27

2.2.2 Effects on Other Wildlife Species, including T&E Species .....	28
2.2.3 Effects on Public Health and Safety .....	28
2.2.4 Impacts to Stakeholders, including Aesthetics .....	29
2.2.5 Humaneness and Animal Welfare Concerns of Methods Used .....	31
2. ISSUES NOT CONSIDERED IN DETAIL WITH RATIONALE .....	31
2.3.1 No Wildlife Damage Management at Taxpayer Expense; Wildlife Damage Management should be Fee Based .....	31
2.3.2 Mammal Damage Should be Managed by Private Nuisance Wildlife Control Agents .....	31
2.3.3 Appropriateness of Preparing an EA (Instead of an EIS) for Such a Large Area .....	31
2.2.4 Effectiveness of Mammal Damage Management Methods.....	31
 <b>CHAPTER 3: ALTERNATIVES</b>	
3.0 INTRODUCTION .....	33
3.1 DESCRIPTION OF THE ALTERNATIVES .....	33
3.1.1 Alternative 1: Technical Assistance Only .....	33
3.1.2 Alternative 2: Integrated Mammal Damage Management Program (Proposed Action/No Action) .....	33
3.1.3 Alternative 3: Non-lethal Mammal Damage Management Only by WS .....	34
3.1.4 Alternative 4: No Federal WS Mammal Damage Management .....	34
3.2 MDM STRATEGIES AND METHODOLOGIES AVAILABLE TO WS IN NEW JERSEY .....	34
3.2.1 Integrated Wildlife Damage Management (IWDM) .....	34
3.2.2 The IWDM Strategies Employed by WS .....	34
3.2.2.1 Examples of WS Direct Operational and Technical Assistance in MDM in New Jersey .....	35
3.2.3 WS Decision Making .....	36
3.2.4 Mammal Damage Management Methods Available for Use .....	37
3.2.4.1 Non-chemical Methods .....	37
3.2.4.2 Chemical Methods .....	38
3.3 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL WITH RATIONALE .....	38
3.3.1 Lethal Mammal Damage Management Only by WS .....	38
3.3.2 Compensation for Mammal Damage Losses .....	39
3.3.3 Reproduction Control .....	39
3.4 MITIGATION AND STANDARD OPERATING PROCEDURES FOR MAMMAL DAMAGE MANAGEMENT TECHNIQUES .....	41
3.4.1 Mitigation in Standard Operating Procedures (SOPs) .....	41
3.4.2 Additional Mitigation Specific to the Issues .....	41
 <b>CHAPTER 4: ENVIRONMENTAL CONSEQUENCES</b>	
4.0 INTRODUCTION .....	43
4.1 ENVIRONMENTAL CONSEQUENCES FOR ISSUES ANALYZED IN DETAIL .....	43
4.1.1 Effects on Target Mammal Species Populations .....	43
4.1.1.1 Alternative 1: Technical Assistance Only .....	43

4.1.1.2 Alternative 2: Integrated Mammal Damage Management Program (Proposed Action /No Action) .....	43
4.1.1.3 Alternative 3: Non-lethal Mammal Damage Management Only by WS .....	54
4.1.1.4 Alternative 4: No Federal WS Mammal Damage Management .....	55
4.1.2 Effects on Other Wildlife Species, including T&E Species .....	55
4.1.2.1 Alternative 1: Technical Assistance Only .....	55
4.1.2.2 Alternative 2: Integrated Mammal Damage Management Program (Proposed Action/No Action) .....	55
4.1.2.3 Alternative 3: Non-lethal Mammal Damage Management Only by WS .....	56
4.1.2.4 Alternative 4: No Federal WS Mammal Damage Management .....	57
4.1.3 Effects on Human Health and Safety .....	57
4.1.3.1 Effects of Chemical MDM Methods on Human Health .....	57
4.1.3.2 Effects of Non-chemical MDM Methods on Human Safety .....	59
4.1.3.3 Effects on Human Health and Safety from Mammals .....	60
4.1.4 Impacts to Stakeholders, including Aesthetics .....	61
4.1.4.1 Effects on Human Affectionate Bonds with Individual Mammals and on Aesthetic Values of Wild Mammal Species .....	61
4.1.4.2 Effects on Aesthetic Values of Property Damaged by Mammals .....	62
4.1.5 Humaneness and Animal Welfare Concerns of Methods Used .....	64
4.1.5.1 Alternative 1: Technical Assistance Only .....	64
4.1.5.2 Alternative 2: Implement an Integrated Mammal Damage Management Program (Proposed Action/No Action) .....	64
4.1.5.3 Alternative 3: Non-lethal Mammal Damage Management Only by WS .....	64
4.1.5.4 Alternative 4: No Federal WS Mammal Damage Management .....	64
4.2 CUMULATIVE IMPACTS .....	65
 <b>CHAPTER 5: LIST OF PREPARERS AND PERSONS CONSULTED</b>	
5.1 LIST OF PREPARERS/REVIEWERS .....	68
5.2 LIST OF PERSONS CONSULTED .....	68

## Tables

Table 1-1.	Wildlife Diseases That Pose Potential Human Health Risks in the United States .....	14
Table 1-2.	Annual number of incidents for technical assistance involving mammals for New Jersey Wildlife Services during 1998-2003. ....	24
Table 4-1.	Mammals lethally removed by WS for Mammal Damage Management during FY 2001 through FY 2003 in New Jersey. ....	44
Table 4-2.	Number of mammals harassed by WS for Mammal Damage Management activities during FY 2001 through FY 2003 in New Jersey .....	44
Table 4-3.	Summary of Potential Impacts .....	67

## Figure

Figure 3-1.	WS Decision Model .....	37
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## Appendices

Appendix A.	Literature Cited .....	69
Appendix B.	MDM Methods Available for Use or Recommendation by the New Jersey Wildlife Services Program .....	78
Appendix C.	Federally Listed Threatened and Endangered Species in New Jersey ....	85
Appendix D.	Correspondence from USFWS Regarding Federal T&E Species .....	88
Appendix E.	State Listed Threatened and Endangered Species in New Jersey .....	92
Appendix F.	Correspondence from NJDFW ENSP Regarding State-listed T&E Species .....	97

## SUMMARY OF PROPOSED ACTION

The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) proposes to continue the current damage management program that responds to mammal damage in the State of New Jersey. WS involvement in mammal damage management in New Jersey is closely coordinated with the New Jersey Division of Fish and Wildlife, and WS take of mammals is authorized through permits and/or other authorities. An Integrated Wildlife Damage Management (IWDM) approach would be implemented to reduce mammal damage to property, agricultural resources, and natural resources, and to reduce mammal impacts on human/public health and safety. Damage management would be conducted on public and private property in New Jersey when the resource owner (property owner) or manager requests assistance. An IWDM strategy would be recommended and used, encompassing the use of practical and effective methods of preventing or reducing damage while minimizing harmful effects of damage management measures on humans, target and non-target species, and the environment. Under this action, WS could provide technical assistance and direct operational damage management, including non-lethal and lethal management methods by applying the WS Decision Model (Slate et al. 1992). When appropriate, physical exclusion, habitat modification or harassment would be recommended and utilized to reduce damage. In other situations, mammals would be removed as humanely as possible using shooting, trapping, and registered pesticides and other products. In determining the damage management strategy, preference would be given to practical and effective non-lethal methods. However, non-lethal methods may not always be applied as a first response to each damage problem. The most appropriate response could often be a combination of non-lethal and lethal methods, or could include instances where application of lethal methods alone would be the most appropriate strategy.

## ACRONYMS

ADC	Animal Damage Control
AMDUCA	Animal Medicinal Drug Use Clarification Act
APHIS	Animal and Plant Health Inspection Service
AVMA	American Veterinary Medical Association
MDM	Mammal Damage Management
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
DEA	Drug Enforcement Administration
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FDA	Food and Drug Administration
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FY	Fiscal Year
IWDM	Integrated Wildlife Damage Management
MBTA	Migratory Bird Treaty Act
MDM	Mammal Damage Management
MIS	Management Information System
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
NJAES	New Jersey Agricultural Experiment Station
NJDA	New Jersey Department of Agriculture
NJDEP	New Jersey Department of Environmental Protection
NJDFW	New Jersey Division of Fish and Wildlife
NJDHSS	New Jersey Department of Health and Senior Services
NJPCP	New Jersey Pesticide Control Program
ORV	Oral Rabies Vaccination
RSU	Rutgers, The State University of New Jersey
SOP	Standard Operating Procedure
T&E	Threatened and Endangered
TGE	Transmissible Gastroenteritis
USDA	U.S. Department of Agriculture
USDI	U.S. Department of Interior
USFWS	U.S. Fish and Wildlife Service
WS	Wildlife Services

**NOTE:** On August 1, 1997, the Animal Damage Control program was officially renamed to Wildlife Services. The phrases Animal Damage Control, ADC, Wildlife Services, and WS are used synonymously throughout this Environmental Assessment.

## CHAPTER 1: PURPOSE AND NEED FOR ACTION

### 1.0 INTRODUCTION

Across the United States, wildlife habitat has been substantially changed as human populations expand and land is used for human needs. These human uses and needs often compete with the needs of wildlife which increase the potential for conflicting human/wildlife interactions. In addition, segments of the public desire protection for all wildlife; this protection can create localized conflicts between human and wildlife activities. The *Animal Damage Control Programmatic Final Environmental Impact Statement* (EIS) summarizes the relationship in American culture of wildlife values and wildlife damage in this way (United States Department of Agriculture 1997):

*"Wildlife has either positive or negative values, depending on varying human perspectives and circumstances . . . Wildlife is generally regarded as providing economic, recreational and aesthetic benefits . . . and the mere knowledge that wildlife exists is a positive benefit to many people. However . . . the activities of some wildlife may result in economic losses to agriculture and damage to property . . . Sensitivity to varying perspectives and value is required to manage the balance between human and wildlife needs. In addressing conflicts, wildlife managers must consider not only the needs of those directly affected by wildlife damage but a range of environmental, sociocultural and economic considerations as well."*

Wildlife damage management is the science of reducing damage or other problems associated with wildlife and is recognized as an integral part of wildlife management (The Wildlife Society 1990). The USDA, Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) program (formerly known as Animal Damage Control) uses an Integrated Wildlife Damage Management (IWDM) approach, known as Integrated Pest Management (WS Directive 2.105<sup>1</sup>), in which a combination of methods may be used or recommended to reduce wildlife damage. IWDM is described in Chapter 1:1-7 of USDA (1997). These methods may include alteration of cultural practices and habitat and behavioral modification to prevent or reduce damage. The reduction of wildlife damage may also require that local populations be reduced through lethal means.

This environmental assessment (EA) documents the analysis of the potential environmental effects of a proposed mammal damage management (MDM) program. This analysis relies on data contained in published documents (Appendix A), including the *Animal Damage Control Program Final Environmental Impact Statement* (USDA 1997). The final environmental impact statement (USDA 1997) may be obtained by contacting the USDA, APHIS, WS Operational Support Staff at 4700 River Road, Unit 87, Riverdale, MD 20737-1234.

WS is the federal agency directed by law and authorized to protect American resources from damage associated with wildlife (Animal Damage Control Act of March 2, 1931, as amended (46 Stat. 1486; 7 U.S.C. 426-426c) and the Rural Development, Agriculture, Related Agencies Appropriations Act of 1988, Public Law 100-102, Dec. 27, 1987. Stat. 1329-1331 (7 U.S.C. 426c), and the Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act of 2001, Public Law 106-387, October 28, 2000. Stat. 1549 (Sec 767). To fulfill this Congressional direction, WS activities are conducted to prevent or reduce wildlife damage caused to agricultural, industrial and natural resources; property; livestock; and threats to public health and safety on private and public lands in cooperation with federal, state and local agencies, private organizations, and individuals. Therefore, wildlife damage management is not based on punishing offending animals, but as one means of reducing damage, and is used as part of the WS Decision Model (Slate et al. 1992). The imminent threat of damage or loss of resources is often sufficient for individual actions to be initiated. The need for action is derived from the specific threats to resources or the public.

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<sup>1</sup> WS Policy Manual - Provides guidance for WS personnel to conduct wildlife damage management activities through Program Directives. WS Directives referenced in this EA can be found in the manual but will not be referenced in the Literature Cited Appendix.



Normally, according to the APHIS procedures implementing the National Environmental Policy Act (NEPA), individual wildlife damage management actions may be categorically excluded {7 CFR 372.5(c), 60 Fed. Reg. 6,000 -6,003, (1995)}. WS has decided in this case to prepare this EA to facilitate planning, interagency coordination, and the streamlining of program management, and to clearly communicate with the public the analysis of individual and cumulative impacts. In addition, this EA has been prepared to evaluate and determine if there are any potentially significant or cumulative impacts from the proposed and planned damage management program. All wildlife damage management that would take place in New Jersey would be undertaken according to relevant laws, regulations, policies, orders and procedures, including the Endangered Species Act (ESA). Notice of the availability of this document will be published in newspapers, consistent with the agency's NEPA procedures.

WS is a cooperatively funded, service-oriented program that receives requests for assistance from private and public entities, including other governmental agencies. Before any wildlife damage management is conducted, Cooperative Agreements, Agreements for Control or other comparable documents are in place. As requested, WS cooperates with land and wildlife management agencies to reduce wildlife damage effectively and efficiently according to applicable federal, state and local laws and Memorandums of Understanding (MOUs) between WS and other agencies. WS's mission, developed through its strategic planning process, is

1) *"to provide leadership in wildlife damage management in the protection of America's agricultural, industrial and natural resources, and*

2) *to safeguard public health and safety."*

WS's Policy Manual reflects this mission and provides guidance for engaging in wildlife damage management through:

- Training of wildlife damage management professionals;
- Development and improvement of strategies to reduce losses and threats to humans from wildlife;
- Collection, evaluation, and dissemination of management information;
- Informing and educating the public on how to reduce wildlife damage;
- Providing data and a source for limited-use management materials and equipment, including pesticides (USDA 1989).

## 1.1 AUTHORITY AND COMPLIANCE

### 1.1.1 Wildlife Services Legislative Authority

The USDA is directed by law to protect American agriculture and other resources from damage associated with wildlife. The primary statutory authority for the Wildlife Services program is the Animal Damage Control Act of March 2, 1931, as amended (46 Stat. 1486; 7 U.S.C. 426-426c) and the Rural Development, Agriculture, Related Agencies Appropriations Act of 1988, Public Law 100-102, Dec. 27, 1987. Stat. 1329-1331 (7 U.S.C. 426c), and the Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act of 2001, Public Law 106-387, October 28, 2000. Stat. 1549 (Sec 767), which provides that:

*"The Secretary of Agriculture may conduct a program of wildlife services with respect to injurious animal species and take any action the Secretary considers necessary in conducting the program. The Secretary shall administer the program in a manner consistent with all of the wildlife services authorities in effect on the day before the date of the enactment of the Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2001."*

Since 1931, with changes in societal values, WS policies and its programs place greater emphasis on the part of the Act discussing "bringing (damage) under control", rather than "eradication" and "suppression"

of wildlife populations. In 1988, Congress strengthened the legislative directive and authority of WS with the Rural Development, Agriculture, and Related Agencies Appropriations Act. This Act states, in part:

*"That hereafter, the Secretary of Agriculture is authorized, except for urban rodent control, to conduct activities and to enter into agreements with States, local jurisdictions, individuals, and public and private agencies, organizations, and institutions in the control of nuisance mammals and birds and those mammals and birds species that are reservoirs for zoonotic diseases, and to deposit any money collected under any such agreement into the appropriation accounts that incur the costs to be available immediately and to remain available until expended for Animal Damage Control activities."*

Additionally, Memoranda of Understanding among WS and other governmental agencies describe WS responsibilities in wildlife damage management. For example, a Memorandum of Understanding between the Federal Aviation Administration (FAA) and WS recognizes WS role and expertise in providing wildlife hazard management assistance to the aviation community. It states, that the "FAA or the certificated airport may request technical and operational assistance from WS to reduce wildlife hazards."

#### **1.1.2 New Jersey Department of Agriculture (NJDA)**

The NJDA currently has an MOU with WS, which establishes a cooperative relationship between WS and the NJDA, and outlines roles and responsibilities for resolving wildlife damage management situations in New Jersey. The mission of the NJDA is to develop, promote, conserve, and support the agriculture and agribusiness industry of the state and those natural and renewable resources that are associated with agriculture and other open lands for the benefit of all its citizens. NJDA provides agricultural information and statistics to WS, forwards citizen's requests for wildlife damage management assistance to WS, and communicates wildlife damage management information to NJ's agricultural community. The NJDA chairs and coordinates meetings of the Animal Emergency Working Group (AEWG) and Wildlife Working Group, which consist of representatives from agencies involved in aspects of emergency planning and response to disasters involving animals and wildlife damage management in NJ, respectively.

#### **1.1.3 New Jersey Department of Environmental Protection, Division of Fish and Wildlife (NJDFW)**

The NJDFW currently has an MOU with WS, which establishes a cooperative relationship between WS and the NJDFW, and outlines roles and responsibilities for resolving wildlife damage management situations in New Jersey. The mission of the NJDFW is to protect and manage the State's fish and wildlife to maximize their long-term biological, recreational, and economic values for all New Jerseyans.

NJDFW Wildlife Control Unit. The NJDFW Wildlife Control Unit (WCU) has primary authority to handle wildlife damage management problems and programs involving resident game and furbearer species in NJ, as well as resident game birds such as wild turkey. WS and the NJDFW WCU cooperatively assist NJ airports with wildlife hazard management issues related to mammals, such as white-tailed deer. The WCU staff of 10 biological personnel conduct damage management programs for white-tailed deer, coyote, black bear, beaver, muskrats, and other mammals. For deer damage management, the WCU conducts the following programs: 1. provision of management recommendations, 2. issuance of Permits to Kill Wild Deer (NJAC 7:25-23, approximately 400 in 2003), 3. distribution of repellents (Hinder and Magic Circle) to NJ farmers (in 2003, funding level of \$7,000, distribution of approximately 300 gallons of repellents), 4. issuance of permits to authorize use of mechanical noisemaking devices (such as propane cannons) to reduce wildlife damage (NJAC 7:25-3.1-.5), and 5. implementation of special programs as needs and funding exist, such as distribution of deer fence materials and instructions. For beaver, the WCU responds to requests for damage management assistance by: 1. provision of management recommendations, 2. removal of beavers associated with damage, 3. assistance with construction of flumes, 4. issuance of Special Wildlife Management Permits for trappers to remove beavers associated with damage during times other than the trapping season and 5. issuance of Special Site Specific Permits to trappers to harvest beaver during the trapping season on properties where these animals are associated with damage. The WCU also

refers trappers to property owners with beaver-related problems so that beaver involved in damage situations can be trapped during the harvest season. For muskrat damage management, the WCU provides management recommendations, issues Special Wildlife Management Permits to Destroy Muskrats, and recommends property owners participation in recreational muskrat trapping seasons (allow access by trappers). For damage problems associated with squirrel, raccoon, opossum, woodchuck, and coyotes, the WCU provides management recommendations, encourages participation in trapping/hunting seasons, and informs callers of their ability to take these species without permit to reduce damage (NJAC 7:25-5.21) and to capture/relocate some of these species pursuant to the NJDFW Policy on Relocation of Wildlife. For coyotes, the WCU also provides services to people with damage problems, including removal of coyotes through trapping or shooting, and provision of management recommendations to reduce damage and losses. For red fox, the WCU provides damage management information, occasionally allows rehabilitators to relocate fox away from damage situations, and supports participation in red fox trapping seasons. The WCU also euthanizes mammals such as squirrels, raccoons, opossums and woodchucks in instances where the animal is sick, injured, or otherwise incapacitated, or where it poses a health and safety threat to the public.

For black bear damage management, the WCU provides damage abatement recommendations to those experiencing problems, trains municipal police officers in proper bear response procedures, issues permits to NJ farmers to kill depredating black bears, destroys severe problem bears (Category I), employs aversive conditioning methods on problem black bears (Category II), and provides educational materials for citizens to bear proof residences and communities (Carr and Burgess 2003). In NJ, black bear damage management is handled entirely by the NJDFW, WS would not take black bears under the Proposed Action, and black bear damage management issues are not considered in this EA.

NJDFW Endangered and Nongame Species Program. The NJDFW Endangered and Nongame Species Program (ENSP) administers programs related to nongame wildlife species such as moles, shrews, and voles, and conducts management and education programs for endangered, threatened, and nongame wildlife species in NJ. ENSP implements a permitting process regarding take of nongame species (NJAC 7:25-4). Management programs implemented or supported by ENSP include those associated with managing mammal predation on rare shorebirds such as piping plovers and least terns.

NJDFW Upland Game and Furbearer Project. NJDFW Upland Game and Furbearer Project administers trapping seasons, research, and other projects and programs related to furbearers, such as red fox, coyote, skunks, and others. The Furbearer Unit develops population estimates for these species, manages trapping seasons, tracks harvest, and conducts research on furbearer management and ecology. Trapping seasons and limits are developed according to the NJDFW management priorities for these furbearers

NJDFW White-Tailed Deer Research Project. The goals of the NJDFW Deer Research Project are: 1. To maintain a healthy deer population on suitable habitat throughout the state, 2. To keep the deer population at a density tolerable to NJ residents, and 3. To maximize the recreational and economic benefits derived from this renewable resource. The Deer Project administers six (6) deer hunting seasons (Fall bow, Permit Bow, Six-day Firearm, Permit Muzzleloader, Permit Shotgun, and Winter Bow) (NJAC 7:25-5.25-.30) for NJ'S 61 Deer Management Zones (DMZ's), conducts research, implements the Community Based Deer Management Program (NJ Public Law 2000 Chapter 46, C.23:4-42.3 et al., and NJAC 7:25-5.32), and provides information to the public regarding NJ deer management. The Deer Project works closely with the Wildlife Control Unit and the Office of Fish and Wildlife Health and Forensics to implement coordinated deer management programs in New Jersey. In determining deer population management strategies (increase, decrease or stabilize), the NJDFW considers deer-vehicle collisions, deer damage to agriculture and other resources, the public's tolerance and appreciation for deer, and other factors. For 2003-2004, the NJDFW's strategies for the 61 DMZ's in NJ are either to stabilize (26 DMZ's) or decrease (35 DMZ's) the deer population.

NJDFW Office of Fish and Wildlife Health and Forensics. The NJDFW Office of Fish and Wildlife Health and Forensics conducts research, surveillance, and monitoring projects related to wildlife health. Health and Forensics has conducted Chronic Wasting Disease surveys on NJ hunter-harvested white-tailed

deer during 1998, 2002, and 2003, through cooperative partnerships with USDA, NJDA, and East Stroudsburg University. USDA APHIS WS and Health and Forensics cooperate together to conduct an evaluation of the Cape May County Oral Rabies Vaccination (ORV) program, which has been implemented operationally since 1995 to stop the spread of raccoon strain of rabies onto the Cape May Peninsula (see Section 1.3.1).

#### **1.1.4 New Jersey Department of Environmental Protection, Pesticide Control Program**

The primary function of the NJDEP Pesticide Control Program (PCP) is to ensure compliance with Federal and State laws and regulations regarding the use, sale, transport, disposal, manufacture, and storage of pesticides in the State of New Jersey. It also promotes pollution prevention and pesticide use reduction initiatives, and supports the Integrated Pest Management strategy. The PCP implements systems for the registration of pesticide products, licensing of private and commercial pesticide applicators, and licensing of pesticide businesses. The PCP implements regulations found in N.J.A.C. Title 7 Chapter 30, Subchapters 1-12. Within the PCP, the Bureau of Pesticide Operations (BPO) certifies and licenses pesticide users, registers pesticide products, and conducts other pesticide-related functions. Also within the PCP, the Bureau of Pesticide Compliance (BPC) enforces State code and Federal FIFRA requirements. Pesticide products and repellents for mammal damage control are registered through the PCP by USDA APHIS WS and other entities (eg. pesticide manufacturers). Pesticide products and repellents available for use in mammal damage management in NJ are discussed in Appendix B. Prior to conduct of management programs involving registered products or pesticides, current registration status is determined through consultation with the PCP.

#### **1.1.5 New Jersey Department of Health and Senior Services**

The New Jersey Department of Health and Senior Services (NJDHSS) currently has an MOU with WS, which establishes a cooperative relationship between WS and the NJDHSS, and outlines roles and responsibilities for resolving wildlife damage management situations in New Jersey. The NJDHSS provides technical guidance to WS on public health related issues and potential health problems associated with wildlife, and refers callers with wildlife damage related questions to WS.

**1.1.6 New Jersey Agricultural Experiment Station, Cook College, Rutgers, The State University**  
The New Jersey Agricultural Experiment Station (NJAES), Cook College, Rutgers, The State University (RSU) currently has an MOU with WS, which establishes a cooperative relationship between WS and the NJAES, and outlines roles and responsibilities for resolving wildlife damage management situations in New Jersey. NJAES RSU provides educational, outreach, and extension information to citizens, and provides educational sessions and courses on wildlife issues. Rutgers Center for Wildlife Damage Control provided coordination assistance with implementation of the Community Based Deer Management Program conducted by WS in 2001, and implemented aspects of a deer fence distribution program to NJ farmers during 1998.

#### **1.1.7 U.S. Fish and Wildlife Service (USFWS)**

The USFWS is responsible for managing and regulating take of bird species that are listed as migratory under the Migratory Bird Treaty Act (MBTA) and those that are listed as threatened or endangered under the ESA. In NJ, the USFWS administers five National Wildlife Refuges (E.B. Forsythe, Cape May, Great Swamp, Wallkill River and Supawna Meadows NWR's), two Law Enforcement Offices (in Elizabeth and Pleasantville, NJ), and an Ecological Services Field Office (Pleasantville, NJ).

The USFWS authority for action is based on the MBTA of 1918 (as amended), which implements treaties with the United States, Great Britain (for Canada), the United Mexican States, Japan, and the Soviet Union. Section 3 of this Act authorized the Secretary of Agriculture:

*"From time to time, having due regard to the zones of temperature and distribution, abundance, economic value, breeding habits, and times and lines of migratory flight of such birds, to determine when, to what*

*extent, if at all, and by what means, it is compatible with the terms of the convention to allow hunting, taking, capture, killing, possession, sale, purchase, shipment, transportation, carriage, or export of any such bird, or any part, nest, or egg thereof, and to adopt suitable regulations permitting and governing the same, in accordance with such determinations, which regulations shall become effective when approved by the President."*

The authority of the Secretary of Agriculture, with respect to the Migratory Bird Treaty, was transferred to the Secretary of the Interior in 1939 pursuant to Reorganization Plan No. II. Section 4(f), 4 Fed. Reg. 2731, 53 Stat. 1433.

CFR 50 Subchapter C - The National Wildlife Refuge System - Part 30 - Feral Animals - Subpart B-30.11 - Control of feral animals states: (a) Feral animals, including horses, burros, cattle, swine, sheep, goats, reindeer, dogs, and cats, without ownership that have reverted to the wild from a domestic state may be taken by authorized federal or state personnel or by private persons operating under permit in accordance with applicable provisions of federal or state law or regulation.

#### **1.1.8 Compliance with Federal and State Statutes**

Several federal laws, state laws, and state regulations regulate WS wildlife damage management. WS complies with these laws and regulations, and consults and cooperates with other agencies as appropriate.

**National Environmental Policy Act.** Environmental documents pursuant to NEPA must be completed before operational activities consistent with the NEPA decision can be implemented. This EA meets the NEPA requirement for the proposed action in New Jersey. When WS direct management assistance is requested by another federal agency, NEPA compliance is the responsibility of the other federal agency. However, WS could agree to complete NEPA documentation at the request of the other federal agency. WS also coordinates specific projects and programs with other agencies. The purpose of these contacts is to coordinate any wildlife damage management that may affect resources managed by these agencies or affect other areas of mutual concern.

**Endangered Species Act (ESA).** It is federal policy, under the ESA, that all federal agencies shall seek to conserve endangered and threatened species and shall utilize their authorities in furtherance of the purposes of the Act (Sec. 2(c)). WS conducts Section 7 consultations with the United States Fish and Wildlife Service (USFWS) to use the expertise of the USFWS to ensure that "any action authorized, funded or carried out by such an agency... is not likely to jeopardize the continued existence of any endangered or threatened species . . . each agency shall use the best scientific and commercial data available" (Sec. 7(a)(2)). WS obtained a Biological Opinion (B.O.) from the U.S. Fish and Wildlife Service describing potential effects on T&E species and prescribing reasonable and prudent measures for avoiding jeopardy (USDA 1997, Appendix F). Additionally, WS conferred with the USFWS in preparation of this EA during 2003 and 2004, regarding an analysis of potential impacts to Federally listed and candidate species (Appendix D) in NJ.

**Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).** FIFRA requires the registration, classification, and regulation of all pesticides used in the United States. The U.S. Environmental Protection Agency (EPA) is responsible for implementing and enforcing FIFRA. All chemical methods integrated into the WS program in New Jersey are registered with and regulated by the EPA and New Jersey Department of Environmental Protection (NJDEP) Pesticide Control Program (PCP) and used by WS in compliance with labeling procedures and other requirements.

**Executive Order 13112 of February 3, 1999.** This order directs Federal agencies to use their programs and authorities to prevent the spread or to control populations of invasive species that cause economic or environmental harm, or harm to human health. To comply with Executive Order 13112, WS may cooperate with other Federal, State, or Local government agencies, or with industry or private individuals to reduce damage to the environment or threats to human health and safety.

**Occupational Safety and Health Act of 1970.** The Occupational Safety and Health Act of 1970 and its implementing regulations (29CFR1910) on sanitation standards states that, "Every enclosed workplace shall be so constructed, equipped, and maintained, so far as reasonably practical, as to prevent the entrance or harborage of rodents, insects, and other vermin. A continuing and effective extermination program shall be instituted where their presence is detected." This standard includes mammals that may cause safety and health concerns at workplaces.

**The Clean Water Act (33 U.S.C. 1344).** The Clean Water Act provides regulatory authority and guidelines for the EPA and the U.S. Army Corps of Engineers related to wetlands. Several Sections of the Clean Water Act pertain to regulating effects on wetlands. Section 101 specifies the objectives of this Act, which are implemented largely through Subchapter III (Standards and Enforcement), Section 301 (Prohibitions). The discharge of dredged or fill material into waters of the United States is subject to permitting specified under Subchapter IV (Permits and Licenses) of this Act. Section 401 (Certification) specifies additional requirements for permit review particularly at the State level. WS consults with appropriate regulatory authorities when wetlands exist in proximity to proposed activities or when such activities might impact wetland areas. Such consultations are designed to determine if any wetlands will be affected by proposed actions.

**Food Security Act.** The Wetland Conservation provision (Swampbuster) of the 1985 (16 U.S.C. 3801-3862), 1990 (as amended by PL 101-624), and 1996 (as amended by PL 104-127) Food Security Act require all agricultural producers to protect wetlands on the farms they own. Wetlands converted to farmland prior to December 23, 1985 are not subject to wetland compliance provisions even if wetland conditions return as a result of lack of maintenance or management. If prior converted cropland is not planted to an agricultural commodity (crops, native and improved pastures, rangeland, tree farms, and livestock production) for more than 5 consecutive years and wetland characteristics return, the cropland is considered abandoned and then becomes a wetland subject to regulations under Swampbuster and Section 404 of the Clean Water Act. NRCS is responsible for certifying wetland determinations according to this Act.

**The Native American Graves and Repatriation Act of 1990.** The Native American Graves Protection and Repatriation Act requires federal agencies to notify the Secretary of the Department that manages the federal lands upon the discovery of Native American cultural items on federal or tribal lands. Federal projects would discontinue work until a reasonable effort has been made to protect the items and the proper authority has been notified.

**National Historic Preservation Act (NHPA) of 1966 as amended.** The NHPA of 1966, and its implementing regulations (36 CFR 800), requires federal agencies to: 1) determine whether activities they propose constitute "undertakings" that has the potential to cause effects on historic properties and, 2) if so, to evaluate the effects of such undertakings on such historic resources and consult with the Advisory Council on Historic Preservation (i.e. State Historic Preservation Office, Tribal Historic Preservation Officers), as appropriate. WS actions on tribal lands are only conducted at the tribe's request and under signed agreement; thus, the tribes have control over any potential conflict with cultural resources on tribal properties.

Each of the MDM methods described in this EA that might be used operationally by WS do not cause major ground disturbance, do not cause any physical destruction or damage to property, do not cause any alterations of property, wildlife habitat, or landscapes, and do not involve the sale, lease, or transfer of ownership of any property. In general, such methods also do not have the potential to introduce visual, atmospheric, or audible elements to areas in which they are used that could result in effects on the character or use of historic properties. Therefore, the methods that would be used by WS under the proposed action are not generally the types of activities that would have the potential to affect historic properties. If an individual activity with the potential to affect historic resources is planned under an alternative selected as a result of a decision on this EA, then site-specific consultation as required by Section 106 of the NHPA would be conducted as necessary.

There is potential for audible effects on the use and enjoyment of a historic property when methods such as propane exploders, pyrotechnics, firearms, or other noise-making methods are used at or in close proximity to such sites for purposes of hazing or removing animals. However, such methods would only be used at a historic site at the request of the owner or manager of the site to resolve a damage or nuisance problem, which means such use would be to benefit the historic property. A built-in mitigating factor for this issue is that virtually all of the methods involved would only have temporary effects on the audible nature of a site and can be ended at any time to restore the audible qualities of such sites to their original condition with no further adverse effects. Site-specific consultation as required by Section 106 of the NHPA would be conducted as necessary in those types of situations.

**Environmental Justice and Executive Order 12898 - "Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations."** Executive Order 12898, promotes the fair treatment of people of all races, income levels and cultures with respect to the development, implementation and enforcement of environmental laws, regulations and policies. Environmental justice is the pursuit of equal justice and protection under the law for all environmental statutes and regulations without discrimination based on race, ethnicity, or socioeconomic status. Environmental Justice is a priority within APHIS and WS. Executive Order 12898 requires federal agencies to make environmental justice part of their mission, and to identify and address disproportionately high and adverse human health and environmental effects of federal programs, policies and activities on minority and low-income persons or populations. APHIS implements Executive Order 12898 principally through its compliance with NEPA. All WS activities are evaluated for their impact on the human environment and compliance with Executive Order 12898.

WS personnel use only legal, effective, and environmentally safe wildlife damage management methods, tools, and approaches. All pesticides used by WS are regulated by the EPA through FIFRA, the New Jersey Department of Environmental Protection, by MOUs with land managing agencies, and by WS Directives. Based on a thorough Risk Assessment, APHIS concluded that when WS program chemicals are used according to label directions, they are selective to target individuals or populations, and such use has negligible impacts on the environment (USDA 1997, Appendix P). The WS operational program properly disposes of any excess solid or hazardous waste. It is not anticipated that the proposed action would result in any adverse or disproportionate environmental impacts to minority and low-income persons or populations. In contrast, the proposed action may benefit minority or low-income populations by reducing mammal damage such as threats to public health and safety.

**Protection of Children from Environmental Health and Safety Risks (Executive Order 13045).** Children may suffer disproportionately from environmental health and safety risks for many reasons, including their developmental, physical and mental status. Because WS makes it a high priority to identify and assess environmental health and safety risks that may disproportionately affect children, WS has considered the impacts that this proposal might have on children. The proposed mammal damage management program would only occur by using legally available and approved methods where it is highly unlikely that children would be adversely affected. For these reasons, WS concludes that it would not create an environmental health or safety risk to children from implementing this proposed action.

**Federal Food, Drug, and Cosmetic Act (21 U.S.C. 360).** This law places administration of pharmaceutical drugs, including those used in wildlife capture and handling, under the Food and Drug Administration.

**Controlled Substances Act of 1970 (21 U.S.C. 821 et seq.).** This law requires an individual or agency to have a special registration number from the federal Drug Enforcement Administration (DEA) to possess controlled substances, including those that are used in wildlife capture and handling.

**Animal Medicinal Drug Use Clarification Act of 1994 (AMDUCA).** The AMDUCA and its implementing regulations (21 CFR Part 530) establish several requirements for the use of animal drugs, including those used to capture and handle wildlife in rabies management programs. Those requirements are: (1) a valid "veterinarian-client-patient" relationship, (2) well defined record keeping, (3) a withdrawal

period for animals that have been administered drugs, and (4) identification of animals. A veterinarian, either on staff or on an advisory basis, would be involved in the oversight of the use of animal capture and handling drugs under the proposed action. Veterinary authorities in each state have the discretion under this law to establish withdrawal times (i.e., a period of time after a drug is administered that must lapse before an animal may be used for food) for specific drugs. Animals that might be consumed by a human within the withdrawal period must be identified; the Western Wildlife Health Committee of the Western Association of Fish and Wildlife Agencies has recommended that suitable identification markers include durable ear tags, neck collars, or other external markers that provide unique identification (WWHC *undated*). APHIS-WS establishes procedures in each state for administering drugs used in wildlife capture and handling that must be approved by state veterinary authorities in order to comply with this law.

#### **New Jersey Wildlife Laws, Regulations and Policies Regarding Mammal Damage Management**

New Jersey Statutes Annotated (NJSA) Title 23 contains fish, game, and wildlife law for the State of New Jersey.

1. NJSA 23:4-42.4. A County Board of Agriculture, municipal governing body, or owner or operator of an airport may submit to the NJDFW for its approval a Community Based Deer Management Plan (CBDMP) and Application for designation of a special deer management area. Implementation of the CBDMP occurs as regulated by the NJDFW (NJAC 7:25-5.32).
2. NJSA 23:4-63.3 and 4. Except as authorized pursuant to a permit issued by the NJDEP, or as provided for by the "Administrative Procedures Act", it is not legal to release indigenous or exotic animals into the environment
3. NJSA 23:4-63.5 and 6. Agricultural landowners may use noise making and other mechanical devices to scare or repel damaging wildlife in order to prevent the damage and destruction of crops and other property. The NJDFW shall issue permits to authorize this use.
4. NJSA 23:4-16. In order for any person, except the owner or lessee of a building, to possess a loaded firearm within 450 feet on any occupied building, for the purposes of hunting, taking, or killing of any animal, written authorization from the owner/lessee is required.

The New Jersey Administrative Code (NJAC) contains regulations necessary to implement laws. Mammal damage-related laws and regulations are summarized here.

1. NJAC 7:25 Subchapter 5. These regulations constitute the "State of New Jersey Game Code," which is developed annually by the NJDFW pursuant to NJSA 13:1B-30, and approved by the Fish and Game Council of the NJDEP. The Game Code is published in the New Jersey Register each autumn, and established procedures and regulations pertaining to hunting of game species, trapping of furbearers, take of mammals associated with damage, use of firearms during hunting, deer hunting, Special Wildlife Management Permits, and other wildlife-related activities of the NJDFW and the public. Pertinent regulations regarding mammal damage management in the State Game Code are as follows:

a. NJAC 7:25-5.21, which states that people suffering damage from squirrel, raccoon, opossum, skunk, weasel, woodchuck, gray fox, red fox, and coyote may take these species by lawful procedures to control damage. Take of coyotes must be reported to the NJDFW Regional Law Enforcement Office within 24 hours. Lawful procedures are identified in the NJDFW Policy on Relocation of Wildlife and within the Game Code (NJAC 7:25-5).

b. NJAC 7:25-5.32, sets regulation governing issuance of Special Wildlife Management Permits for take of wildlife species in certain circumstances, including when wildlife is associated with damage. An example of this is the NJDFW's issuance of Special Wildlife Management Permit to Destroy Muskrat to reduce damage and implementation of the Community Based Deer Management Program.

c. NJAC 7:25-5.8, 5.9, and 5.11 sets regulations pertaining to trapping harvest of muskrat, beaver, raccoons, fox, opossum, skunk, coyotes and other furbearers.

d. NJAC 7:25-5.6, 5.17, 5.18, and 5.19 sets regulations pertaining to hunting of black bear, raccoon, opossum, woodchuck, red fox, coyotes, and other game species.

e. NJAC 7:25-5.25, 5.26, 5.27, 5.28, 5.29, and 5.30 sets regulations pertaining to six NJ deer hunting seasons: Fall Bow, Winter Bow, Six-Day Firearm, Permit Muzzleloader, Permit Shotgun, and Permit Bow.



2. NJAC 7:25 Subchapter 3. Use of Mechanical Noisemaking Devices. Use of propane cannons is permitted by the NJDFW WCU, to reduce wildlife damage to agricultural crops. These regulations identify legal equipment, placement, timing of operations, and other requirements for use of these devices to control wildlife damage on the farm.

3. NJAC 7:25 Subchapter 23. Permit to Kill Wild Deer. The NJDFW may issue a permit to NJ farmers (land owners or lessees) on cultivated lands to kill wild deer causing damage to seeded cultivated grasses, planted crops, nursery stock, or orchards.

4. NJAC 7:25 Subchapter 4. Nongame and Exotic Wildlife. The NJDFW (ENSP) may issue permits for the possession of nongame species (7:25-4.2) and for the control of nongame species which are creating a hazard to public safety, crops, livestock, or similar concerns (7:25-4.6).

#### Policies of the NJDFW regarding wildlife damage management.

NJ DFW Policy on Relocation of Wildlife. The Policy on Relocation is implemented to ensure that human activities relating to the movement and release of wildlife do not negatively affect human health and safety, agriculture, and local wildlife populations. The Policy sets standards for release of all species, and considers biological and social issues. General release criteria include release of animals as close as possible to the capture site and variation in selection of release sites to minimize creation of "dump" situations. Regarding "nuisance wildlife," damage management techniques such as exclusion and habitat management are emphasized, and relocation of wildlife associated with damage must follow these guidelines: a. during the spring/summer, family groups including young must be relocated together, b. euthanasia of the animal is preferred over relocation if that would result in transfer of the damage problem to the release site, c. if euthanasia is selected, animals may be euthanized according to the methods found acceptable in the Report of the American Veterinary Medical Association's (AVMA 2000) Panel on Euthanasia., and d. state laws and regulations regarding permits to take wildlife species (regulations listed above) must be adhered to. For rehabilitated wildlife, animals which are unlikely to survive cannot be relocated, and should be placed in licensed facilities or euthanized. For mammals, releases should occur on site or within 2 miles of the capture site. For coyotes, fox, and beaver, rehabilitation and relocation is authorized by the NJDFW on a very limited and controlled basis. For rabies vector species (raccoons, skunks, fox and woodchuck), in situations where release at the capture site is not possible, the following applies: a. young animals must be released within the county of origin, but not within townships involved with operational ORV programs, b. adult animals must be released within the township of origin, no greater than 10 miles away for raccoons, and no greater than 5 miles for skunks and woodchucks.

#### New Jersey Pesticide Laws

New Jersey's pesticide regulations, N.J.A.C. Title 7 Chapter 30, Subchapters 1-12, are implemented and enforced by the NJDEP Pesticide Control Program (PCP). These regulations include processes and requirements for pesticide product registration (Subchapter 2), certification of pesticide dealers (2), licensing of pesticide dealer businesses (3), licensing of commercial pesticide operators (5) and applicators (6), licensing of pesticide applicator businesses (7), certification of private pesticide applicators (8), pesticide exposure management (9), pesticide use (10), grace period regulations (11), and agricultural worker protection (12). In order for WS to apply a restricted use pesticide as part of mammal damage management in NJ, the product must be registered with the PCP, the applicator must be licensed, and if a fee is charged, the agency possess a NJ pesticide applicator business license. Additionally, label instructions, and all other pesticide and wildlife laws and regulations must be adhered to (eg. possession of a depredation permit from the NJDFW to take the protected mammal species). Pesticide products are registered annually, and applicator licenses are obtained and maintained through completion of training courses and examinations conducted through the PCP.

### New Jersey Firearm, Trapping and Mechanical Noisemaking Devices Laws

1. NJAC 7:25-3.1 Describes the process for legal use of propane/acetylene/carbide exploders to harass mammals away from agricultural crops. This process includes completion of an application, inspection of a site by NJDFW personnel, and issuance of a permit by the NJDFW. Only devices with a sound level no greater than 128 decibels at 100 feet from the device may be used.
2. NJAC 7:25-5.23(b) Identifies the requirements for a rifle permit if in possession of a rifle while conducting certain activities.
3. NJSA 23:4-22.1 No person shall manufacture, sell, offer for sale, possess, import or transport an animal trap of the steel-jaw leg hold type.
4. NJSA 23:4-22.2. No person shall take or attempt to take any animal by means of a steel-jaw leghold trap.
5. NJSA 23:4-38.2 Conibear trap must be submerged under water, while in use for trapping. In tidal water, Conibear traps must be completely covered by water at normal high tide.

### New Jersey Code of Criminal Justice

2C:39-5c(1) and 58-3 A person in possession of a shotgun must first obtain a firearms purchaser identification card (FID). Exemptions to this are contained in N.J.S. 2C:39-6, and include the provision that no FID is required "To keep or carry any firearm about a person's place of business, residence, premises, or other land owned or possessed by him; a place of business shall be deemed a fixed location." Also, a person traveling to a location to hunt may transport a firearm without an FID.

## 1.2 SCOPE AND PURPOSE OF THIS EA

The scope and purpose of this EA is to address and evaluate the potential impact to the human environment from the implementation of a WS Mammal Damage Management (MDM) program to protect agricultural resources, natural resources, property, livestock, and public health and safety in New Jersey. Damage problems can occur throughout the State, resulting in requests for WS assistance. Under the Proposed Action, MDM could be conducted on private, federal, state, tribal, county, and municipal lands in New Jersey upon request.

Several mammal species have potential to be the subject of WS MDM activities in New Jersey. Mammal species addressed in this EA include: white-tailed deer (*Odocoileus virginianus*), woodchuck (*Marmota monax*), raccoon (*Procyon lotor*), opossum (*Didelphus marsupialis*), muskrat (*Ondatra zibethicus*), beaver (*Castor canadensis*), red fox (*Vulpes vulpes*), striped skunk (*Mephitis mephitis*), gray fox (*Urocyon cinereoargenteus*), Eastern coyote (*Canis latrans*, var.), porcupine (*Erethizon dorsatum*), gray squirrel (*Sciurus carolinensis*), red squirrel (*Tamiasciurus hudsonicus*), domestic/feral dog (*Canis familiaris*), brown (Norway) rat (*Rattus norvegicus*), black (roof) rat (*Rattus rattus*), as well as feral cat (*Felis sp.*), Eastern mole (*Scalopus aquaticus*), star-nosed mole (*Condylura cristata*), short-tailed shrew (*Blarina brevicauda*), house mouse (*Mus musculus*), deer mouse (*Peromyscus maniculatus*), white-footed mouse (*Peromyscus leucopus*), woodland jumping mouse (*Napaeozapus insignis*), meadow jumping mouse (*Zapus hudsonius*), meadow vole (*Microtus pennsylvanicus*), pine vole (*Microtus pinetorum*), and red-backed mouse (*Clethrionomys gapperi*).

This document addresses WS involvement in mammal damage management activities throughout New Jersey for those mammal species identified above. For example, black bear damage management is handled entirely by the NJDFW, WS would not take black bears under the Proposed Action, and black bear damage management issues are not considered in this EA. Additionally, this document does not include consideration of bird damage management environmental issues. In 2002, the WS program conducted a NEPA process and developed an Environmental Assessment (EA) entitled, "Canada Goose Damage Management in New Jersey," which evaluated alternatives and impacts to the environment and selected an Integrated Wildlife Damage Management (IWDM) approach to manage damage associated with Canada geese in NJ (USDA 2002). WS Canada goose damage management in NJ will be conducted in accordance with a Finding of No Significant Impact issued for that Environmental Assessment. In 2003, the WS program completed a NEPA process and developed an EA entitled, "Reducing Bird Damage Through An

Integrated Wildlife Damage Management Program in the State of New Jersey," which evaluated alternatives and impacts to the environment and selected an Integrated Wildlife Damage Management (IWDM) approach to manage damage associated with birds in NJ (USDA 2003). WS bird damage management in NJ will be conducted in accordance with a Finding of No Significant Impact issued for that Environmental Assessment.

### 1.3 NEED FOR ACTION

Conflicts between humans and wildlife are common in New Jersey. The need for action in New Jersey is based on the necessity for a program to protect agriculture, property, livestock, natural resources, and human health and safety from mammal damage. Comprehensive surveys of mammal damage in New Jersey have not been conducted. The data and information reported below are based on requests for assistance from the public to WS NJ, and as such, represent only a portion of the total damage caused by mammals because not all people who experience damage request assistance from WS. In NJ, the NJDFW has management responsibility for resident mammals, and conducts mammal management programs for furbearers, game species, and nongame mammals. Therefore, the majority of mammal damage management requests for assistance from the public are directed to the NJDFW Wildlife Control Unit (bear, deer, beaver, coyote, woodchucks, etc.) or the NJDFW ENSP (moles, chipmunks, voles, etc.). WS involvement in the area of mammal damage management in NJ is to 1. provide basic recommendations and referral of callers to the NJDFW, and 2. provide direct management assistance and implement mammal damage management programs upon request and as permitted or otherwise authorized by the NJDFW. To date, direct management programs regarding mammals conducted by WS in NJ have included mammal predation management to protect rare shorebirds, mammal hazard management at NJ airports, and implementation of a Community-Based Deer Management Program for a County Board of Agriculture. Additionally, WS NJ cooperates with State agencies to assess wildlife disease issues involving mammals. The descriptions of mammal damage situations in NJ which are described below are based on a characterization of assistance requests to WS. In some cases, mammal damage problems handled by the NJDFW are discussed, and noted, and are included to give a more complete description of mammal damage issues that occur in New Jersey.

#### 1.3.1 Need for Mammal Damage Management to Protect Human Health and Safety

In New Jersey human health and safety concerns and problems associated with mammals include, but are not limited to the potential for transmission of zoonotic diseases to humans, mammal hazards at airports, and other problems.

**Zoonotic Diseases.** A considerable threat to human health is sometimes presented by disease organisms or parasites carried by some mammals which are transmissible or infectious to humans. These include viral, bacterial, mycotic (fungal), protozoan and rickettsial diseases. Several of these diseases are transmittable to humans.

Individuals or property owners that request assistance with mammals frequently are concerned about potential disease risks but are unaware of the types of diseases that can be associated with them. Usually, MDM is requested because of a perceived risk to human health or safety associated with wild animals living near humans, from animals acting out of character in human-inhabited areas during the day, or showing no fear when humans are present. Under the proposed action, WS could assist in resolving these types of problems. In the majority of cases in which human health concerns are a major reason for requesting MDM, there may have been no actual cases of transmission of disease to humans by mammals to prompt the request. Thus, it is the risk of disease transmission that is the primary reason for requesting and conducting MDM. Situations in New Jersey where the threat of disease associated with wild or feral mammal populations might occur include, but are not limited to:

- Exposure by residents to the threat of raccoon rabies due to high populations of raccoons in urban and suburban areas or from companion animals coming in contact with infected raccoons in any environment.

- Exposure of residents and pets to bat rabies, particularly from colonies in buildings.
- Accumulated droppings from denning or foraging raccoons and subsequent exposure to raccoon roundworm in fecal deposits in a suburban community or at an industrial site where humans must work or live in areas of accumulation.
- Exposure of humans to threats of rabies posed by skunks denning and foraging in a residential community.
- Threats of parasitic infections to humans from *Giardia* spp. resulting from high beaver populations in a park or recreation area where swimming is allowed.

Beaver activity in certain situations can become a threat to public health and safety (e.g., burrowing into or flooding of roadways and railroad beds can result in serious accidents) (Miller 1983, Woodward 1983). Increased water levels in urban areas resulting from beaver activity can lead to unsanitary conditions and potential health problems by flooding septic systems and sewage treatment facilities (DeAlmeida 1987, Loeb 1994). Beaver damming activity also creates conditions favorable to mosquitoes and can hinder mosquito control efforts or result in population increases of these insects (Wade and Ramsey 1986). While the presence of these insects is largely a nuisance, mosquitoes can transmit diseases, such as Eastern equine encephalitis (Mallis 1982) and West Nile Virus (CDC 2000). In addition, beaver are carriers of the intestinal parasite *Giardia lamblia*, which can contaminate human water supplies and cause outbreaks of the disease Giardiasis in humans (Woodward 1983, Beach and McCulloch 1985, Wade and Ramsey 1986, Miller and Yarrow 1994). The CDC has recorded at least 41 outbreaks of waterborne Giardiasis, affecting more than 15,000 people. Beaver are also known carriers of tularemia, a bacterial disease that is transmittable to humans through bites by arthropod vectors or infected animals or by handling animals or carcasses which are infected (Wade and Ramsey 1986). Skinner et al. (1984) found that in cattle-ranching sections of Wyoming the fecal bacterial count was much higher in beaver ponds than in other ponds, something that can be a concern to ranchers and recreationists. On rare occasions, beaver may contract the rabies virus and attack humans. In February 1999, a beaver attacked and wounded a dog and chased some children that were playing near a stream in Vienna, Virginia. Approximately a week later, a beaver was found dead at the site and tested positive for rabies (T. Meinke, WS, pers. comm., 2003).

Stray cats (*Felis catus*) serve as major reservoirs for the bacterium *Bartonella* spp. Stray cats and their fleas (*Ctenocephalides felis*) are the only known vectors for infecting house bound cats and humans with this bacterium. Humans are not infected via the flea, but pet cats often are infected by flea bites. Human infections that may result from exposure of this bacterium via stray cats include: cat scratch disease in immunocompromized patients, bacillary angiomatosis, hepatic peliosis in immunocompromised patients, endocarditis, bacteremia, osteolytic lesions, pulmonary nodules, neuroretinitis, and neurologic diseases (Heller et al. 1997). In areas where dog rabies has been eliminated, but rabies in wildlife has not, cats often are the most significant domestic animal contracting rabies and presenting a subsequent risk of transmission to humans (Eng and Fishbein 1990; Krebs et al. 1996; Vaughn 1976).

Norway rats (*Rattus norvegicus*) and roof rats (*Rattus rattus*) present disease threats to humans. They live in close association to human habitations and provide a potential source of disease transmission. Many of these diseases are transmitted to humans and animals through primary hosts such as fleas, lice, and mites which live on rats (Schmidt and Roberts 1989). Among the diseases rats may transmit to humans or livestock are murine typhus, leptospirosis, trichinosis, salmonellosis (food poisoning), and ratbite fever (Timm 1994). Plague is a disease that can be carried by a variety of rodents, but it is more commonly associated with roof rats than with Norway rats (Timm 1994). Some diseases associated with rats are listed in Table 1-1. The Norway rat and house mouse are the domestic rodents of greatest public health concern in NJ. Roof rats are not established in NJ, and plague and murine typhus are not currently endemic in NJ.

Hantavirus Pulmonary Syndrome (HPS) is caused by infection with hantaviruses. HPS was first recognized in North America when a cluster of cases was diagnosed in the southwestern US. Infection in humans causes acute, severe respiratory disease with a mortality rate of 38%. Rodents are the primary reservoir hosts of hantaviruses and are asymptomatic carriers, with the white-footed mouse being the primary reservoir host in NJ. Human infection occurs when virus particles aerosolized from rodent urine, feces, or saliva are inhaled or by handling rodents (Davidson and Nettles 1997). There have been no Table

**1-1. Wildlife Diseases That Pose Potential Human Health Risks in the United States (modified from Davidson and Nettles 1997).**

Disease	Causative Agent	Hosts
Anthrax	bacterium ( <i>Bacillus anthracis</i> )	cattle, sheep, horses, swine, white-tailed deer, dogs, cats
Dermatophilosis	bacterium ( <i>Dermatophilus congolensis</i> )	mammals (wild and domestic)
Demodectic mange	mange mite ( <i>Demodex odocoilei</i> )	White-tailed deer
Sarcoptic mange	mite ( <i>Sarcoptes scabiei</i> )	red foxes, coyotes, domestic dogs
Swine brucellosis	bacterium ( <i>Brucella suis</i> )	swine
Trichinosis	nematode ( <i>Trichinella spiralis</i> )	swine, bears, raccoons, foxes, rats
Rabies	virus (Rhabdovirus)	all mammals (high risk wildlife: raccoons, foxes, skunks, bats)
Visceral larval migrans	nematode ( <i>Baylisascaris procyonis</i> )	raccoons, skunks
Leptospirosis	bacteria ( <i>Leptospira interrogans</i> ) over 180 different serovars	All mammals
Echinococcus infection	tapeworm ( <i>Echinococcus multilocularis</i> )	foxes, coyotes
Bovine brucellosis	bacterium ( <i>Brucella abortus</i> )	cattle (evidence from Texas that organism has infected coyotes that scavenged aborted fetuses and placentas of infected cattle)
Toxoplasmosis	protozoan parasite ( <i>Toxoplasma gondii</i> )	Cats, such as bobcats, are definitive hosts, mammals and birds are intermediate hosts
Spirometra infection	tapeworm, ( <i>Spirometra mansonioides</i> )	bobcats, raccoons, foxes, dogs, cats
Murine typhus	bacteria ( <i>Rickettsia mooseri</i> = <i>R. typhi</i> )	rats, mice, as hosts for primary flea, louse or mite host
Giardiasis	protozoan parasite ( <i>Giardia lamblia</i> , <i>G. Duodenalis</i> , and other <i>Giardia</i> sp.-taxonomy controversial)	beavers, coyotes, dogs, cats
Hantavirus Pulmonary Syndrome	Hantaviruses	Rodents
Histoplasmosis	<i>Histoplasma capsulatum</i>	Fungus occurs in bat guano and bird droppings
Lyme Disease	<i>Borrelia burgdorferi</i> (spirocheate)	Rodents
Plague	<i>Yersinia pestis</i>	Rodents
Tuberculosis	<i>Mycobacterium bovis</i>	Cervids

documented cases in New Jersey. However, there have been 2 cases in New York, 1 in Vermont, and 3 in Pennsylvania

Plague is caused by a bacterium transmitted from rodent to rodent by infected fleas. Plague is characterized by periodic disease outbreaks in rodent populations, some of which have a high death rate. During these outbreaks, infected fleas that have lost their normal hosts seek other sources of blood, increasing the risk to humans and other animals frequenting the area. In North America, plague is found from the Pacific Coast eastward to the western Great Plains and from British Columbia and Alberta, Canada southward to Mexico. The last rat-borne epidemic in the U.S. occurred in Los Angeles in 1924-25. Since then, all human plague cases in the U.S. have been sporadic cases acquired from wild rodents or their fleas or from direct contact with plague infected animals. In the U.S. during the 1980's plague cases averaged about 18 per year. About 1 in 7 persons with plague died. Epidemic plague involving rats is best prevented by controlling rat populations in both urban and rural areas.

Tularemia, also known as "rabbit fever" is a disease caused by a bacterium. Tularemia typically infects animals such as rodents, rabbits, and hares. Typically, people become infected through the bite of infected ticks or tabanid flies, by handling infected sick or dead animals, by eating or drinking contaminated food or water, or by inhaling airborne bacteria. About 200 human cases of tularemia are reported each year in the U.S. Most cases occur in the south-central and western states, however cases have been reported in every state except Hawaii. Cases also resulted from laboratory accidents. Without treatment with appropriate antibiotics, tularemia can be fatal (CDC 2003a). The causative agent of tularemia is one of the most infectious pathogenic bacteria known, requiring as few as 10 organisms to cause disease. The Working Group on Civilian Biodefense considers tularemia to be a dangerous potential biological weapon because of its extreme infectivity, ease of dissemination, and substantial capacity to cause illness and death (Dennis et al. 2001).

Anthrax is a disease of mammals and is caused by a spore-forming bacterium. Anthrax has an almost worldwide distribution and in the U.S. it occurs sporadically. The Del Rio, Texas, region reported ongoing outbreaks of anthrax in wild deer and livestock in 2001. Other recent U.S. outbreaks include an outbreak in cattle and horses in Minnesota in 2000; in cattle, horses, and bison in North Dakota in 2000; and in cattle in Nebraska in 2001. Only 18 human cases of anthrax were reported in the U.S. between 1900 and 1978, with the majority occurring in special-risk groups, including goat hair mill or goat skin workers and wool or tannery workers. Two of the cases were laboratory related. A 1993 report by the US Congressional Office of Technology Assessment estimated that between 130,000 and 3 million deaths could follow the aerosolized release of 100kg of anthrax spores upwind of the Washington, DC area, lethally matching or exceeding that of a hydrogen bomb (Inglesby et al. 1999). In October 2001, inhalation anthrax was diagnosed in a Florida man who had no known exposure risk factors. The following week, cases of cutaneous anthrax in persons exposed to letters containing a suspicious powder were reported in New York City. The initial investigation showed that four envelopes containing anthrax spores were mailed through the US Postal Service to media outlets in NYC and senate offices in Washington, DC, in September and October 2001. These four recovered envelopes were postmarked at the USPS Trenton Processing and Distribution Center in New Jersey. On 18 October, cutaneous anthrax was confirmed in a New Jersey postal worker (Greene et al. 2002).

Rabies. Rabies is an acute, fatal viral disease of mammals most often transmitted through the bite of a rabid animal. Rabies is one of the oldest recorded diseases; yet today remains a significant management challenge for public health officials. Rabies is a preventable viral disease of mammals, including humans. However, it is fatal without prior vaccination or post-exposure treatment. Raccoon rabies was first identified in Florida around 1953. In 1977, hunters inadvertently relocated rabid animals to Virginia, thus hastening the spread of rabies along the Atlantic seaboard. Today raccoon rabies is present throughout the Atlantic seaboard from Florida to Maine. In the past 21 years, all of the mid-Atlantic and New England states have experienced at least one rabies outbreak. Rabies primarily affects wild animal populations. Currently, raccoons, skunks, bats, foxes, and coyotes have the most significant impact as wildlife carriers of rabies. Domestic animals account for less than 10% of the reported rabies cases, with cats, cattle, and dogs most often reported rabid (CDC 2003b). The number of rabies related human deaths in the US had

declined from more than 100 annually at the turn of the century to one or two per year in the 1990's (CDC 2003b).

In New Jersey, raccoons are abundant in urban and suburban environments. The disease can be effectively prevented in humans and many domestic animals species, but abundant and widely distributed reservoirs among wild mammals complicate rabies control. The vast majority of rabies cases reported to the Centers for Disease Control and Prevention (CDC) each year occur in raccoons, skunks (primarily *Mephitis mephitis*), and bats (Order *Chiroptera*) (USDA 2001).

Over the last 100 years, rabies in the United States has changed dramatically. About 90% or greater of all animal cases reported annually to CDC now occur in wildlife (Krebs et al. 2000; CDC 2001a). Before 1960 the majority of cases were reported in domestic animals. The principal rabies hosts today are wild carnivores and bats. Modern day prophylaxis, which is the series of vaccine injections given to people who have been potentially or actually exposed, has proven nearly 100% successful in preventing mortality when administered promptly (CDC 2001a). In the U.S., human fatalities associated with rabies occur in people who fail to seek timely medical assistance, usually because they were unaware of their exposure to rabies. Although human rabies deaths are rare, the estimated public health costs associated with disease detection, prevention, and control have risen, exceeding \$300 million annually. These costs include the vaccination of companion animals, maintenance of rabies laboratories, medical costs such as those incurred for exposure case investigations, rabies post-exposure prophylaxis (PEP) and animal control programs (CDC 2001a).

Accurate estimates of the aforementioned expenditures are not available. Although the number of PEPs given in the U.S. each year is unknown, it is estimated to be about 40,000. When rabies becomes epizootic or enzootic (i.e., present in an area over time but with a low case frequency) in a region, the number of PEPs in that area increases. Although the cost varies, a course of rabies immune globulin and five doses of vaccine given over a 4-week period typically exceeds \$1,000 (CDC 2001a) and has been reported to be as high as \$3,000 or more (Meltzer 1996). As epizootics spread in wildlife populations, the risk of "mass" human exposures requiring treatment of large numbers of people that contact individual rabid domestic animals infected by wild rabid animals increase. One case in Massachusetts involving contact with, or drinking milk from, a single rabid cow required PEPs for a total of 71 persons (CDC 2001b). The total cost of this single incident exceeded \$160,000 based on a median cost of \$2,376 per PEP in Massachusetts. Likely the most expensive single mass exposure case on record in the U.S. occurred in 1994 when a kitten from a pet store in Concord, NH tested positive for rabies after a brief illness. As a result of potential exposure to this kitten or to other potentially rabid animals in the store, at least 665 persons received post-exposure rabies vaccinations at a total cost of more than \$1.1 million (Noah et al. 1995).

Raccoon rabies presents a human health threat through potential direct exposure to rabid raccoons, or indirectly through the exposure of pets that had an encounter with rabid raccoons. In March, 2003, a 25-year old Virginia man died from rabies infection, representing the first confirmed human death from the raccoon rabies variant. Additionally, the number of pets and livestock examined and vaccinated for rabies, the number of diagnostic tests requested, and the number of post exposure treatments are all greater when raccoon rabies is present in the area. Human and financial resources allocated to rabies-related human and animal health needs also increase, often at the expense of other important activities and services.

The westward movement of the raccoon rabies front has slowed, probably in response to both natural geographic and man-made barriers. The Appalachian Mountains and perhaps river systems flowing eastward have helped confine the raccoon variant to the eastern U.S. If the "immune barrier" is breached by raccoon rabies, research suggests that raccoon populations are sufficient (Sanderson and Huber 1982, Glueck et al. 1988, Hasbrouck et al. 1992, Mosillo et al. 1999) for rabies to spread westward along a front at a rate similar to or greater than the rate at which this rabies strain has spread in the eastern U.S.

Although human rabies deaths are rare, the estimated public health costs associated with disease detection, prevention, and control have risen, exceeding \$300 million annually. These costs include the vaccination of

companion animals, animal control programs, maintenance of rabies laboratories, and medical costs, such as those incurred for rabies postexposure prophylaxis (CDC 2003b).

In New Jersey, as of 2002, a total of 4,529 animals have tested positive for rabies since the onset of the epizootic in 1989 (from Communicable Disease Service Statistics on NJDHSS website: [state.nj.us/health/cd/stats/](http://state.nj.us/health/cd/stats/)). Of these, 3,277 were raccoons. In 2002, 188 animals were confirmed with rabies and of those 174 were raccoons. Each year since 1995, the Cape May County Department of Health has conducted an Oral Rabies Vaccination (ORV) program. In 2003, 38000 vaccine baits were distributed in an effort to manage the disease; during the period 1995-2003, approximately 342,000 baits have been distributed in Cape May. This project is directed at preventing rabies in the treated area.. The last positive rabies case detected in Cape May County involved a raccoon tested in 2001 just inside the ORV boundary (H. Heacock, Cape May Health Department, pers. comm. 2003). WS involvement in rabies management in NJ has consisted of assisting the NJDFW OWHF in conduct of a project to assess the effectiveness of the operational ORV program conducted by the Cape May County Department of Health during 2002 and 2003. To date, no recovered raccoons (retrieved road-killed animals from 114-miles of roads in Cape May, Cumberland and Atlantic Counties) have tested positive for rabies. An EA completed by WS in 2001 supports rabies management in the eastern US (USDA 2001

WS could provide operational MDM, upon request, involving virtually any mammal species involved in a zoonotic disease issue affecting human health and safety to any requester experiencing such damage anywhere in New Jersey. WS involvement includes, but is not limited to, participation in emergency responses to disease outbreaks, assistance with disease monitoring and research, mammal population management and reduction to contain or eliminate spread/occurrence of wildlife diseases, and other activities.

**Mammal Hazards to Public Safety at Airports.** Wildlife hazard management at airports is motivated by airports' needs to provide a safe flying environment to the public, and to comply with Federal regulations which require airports to assess, monitor, and manage wildlife hazards. FAA regulation FAR Part 139.337 requires airports to assess wildlife hazards and develop management plans to reduce wildlife hazards. The threat to human safety from aircraft collisions with wildlife (wildlife strikes) is increasing (MacKinnon et al. 2001). Although a greater number of wildlife strikes with aircraft involve birds, the most hazardous wildlife species in terms of damage to aircraft, cost of collisions, and effects on flight, is white-tailed deer (Dolbeer et al. 2003). Other mammals which pose hazards to aircraft and public safety are coyotes, feral dogs, fox, woodchucks, and others. The following strike reports indicate the variety of hazards mammals pose to public safety at airports (Wright 2003):

- Deer White-tailed deer pose the greatest wildlife hazards to aviation. For deer-aircraft strikes reported to the FAA for US civil aviation between 1990 and 2003: 1. Eighty-six percent ( 86%) resulted in damage to the aircraft, 2. Seventy-four percent (74%) resulted in an effect on the flight, and 3. the average cost per collision was nearly \$176,000 (Dolbeer et al. 2003). In 2001, the FAA issued a CertAlert (No. 01-01) entitled, "Deer Aircraft Hazard," which identifies the important hazards deer pose to aviation, and recommends deer damage management for airports, including consultation with WS. For the white-tailed deer-aircraft collisions in NJ for the period 1990-2003, aircraft parts damaged included propellers, wing, nose gear, landing gear, wing fuel drain, taxi and landing light systems, gear doors, cabin door, nose door, and others (National Wildlife Strike Database, <http://wildlife-mitigation.tc.faa.gov>). The following are examples of incidents involving deer-aircraft collisions in the US: 1. a Learjet 60 landing in Alabama (January 2001) collided with two deer and ran off the end of the runway. The aircraft was engulfed in flames, and the pilot and first officer were seriously injured, and 2. a Piper 28 landing in New Jersey (September 2000) collided with a deer, and the aircraft veered off the runway and onto the grass.
- Woodchuck. During 1990-2003, there were 43 woodchuck-aircraft strikes at US civil airports, 8 of which occurred in NJ (Cleary et al. 2003). In addition to causing direct strike hazards to aircraft, woodchuck presence on airports also affects airport safety due to gnawing and burrowing damage to cables for lighting and other electrical systems.



- Canids. Strikes between aircraft and feral dogs, fox, and coyotes can create safety hazards at airports. During 1990-2003, there were 199 strikes between aircraft and coyotes, dogs and foxes at US civil airports (Cleary et al. 2003). Fox strikes have been reported to the FAA by two of NJ's 3 air carrier airports (National Wildlife Strike Database, <http://wildlife-mitigation.tc.faa.gov>). In June 1999, a Beechcraft 90 aborted takeoff from a NY airport after striking a coyote. The aircraft sustained severe damage to the nose cone, engines, wings, and fuselage. Lights and other parts, and was out of service for 5 months. Lost revenue and cost of repairs exceeded \$600,000 (National Wildlife Strike Database, <http://wildlife-mitigation.tc.faa.gov>).

Most mammal-aircraft strikes (50%) occur in late summer-autumn (August-November), 64% occur at night, 53% occur during landing roll, and 33% occur during the takeoff run (Cleary et al. 2003). Typically, a higher percentage of mammal strikes (64%) resulted in aircraft damage than did bird strikes (16%) (Cleary et al. 2003). Of the mammal-aircraft strikes that resulted in human injuries or death, most (88%) were attributed to deer (Cleary et al. 2003). The cost of mammal strikes to the civil aviation industry in the U.S. for the period 1990-2002 is estimated to be in excess of 152,698 hours of aircraft downtime and \$29.98 million in monetary losses (Cleary et al. 2003).

In NJ, there are three air carrier airports (Newark Liberty International, Atlantic City International, and Trenton Mercer), and approximately 46 civilian, private-use airports. According to the Federal Aviation Administration's National Wildlife Strike Database (online strike database <http://www.wildlife-mitigation.tc.faa.gov>), during 1990-2003, fourteen (15) NJ civil public use airports reported a total of 64 mammal-aircraft collisions to the FAA. These reported strikes involved at least 9 different mammal species/species groups, with the greatest number of strikes involving the following mammal species/species groups: white-tailed deer (34 strikes), Eastern cottontails/rabbits (10), woodchuck (8), bats (3), opossum (2), red fox/fox (2), muskrat (1), raccoon (1), and skunk (3). The number of mammal strikes actually occurring is likely to be much greater, since an estimated 80% of civil wildlife strikes go unreported (Cleary et al. 2000). Deer strikes occurred at thirteen NJ airports, and all other strikes involving mammals occurred at only 3 airports (Atlantic City International Airport, Newark Liberty International Airport, and Teterboro Airport).

WS receives requests for assistance regarding mammal damage management at civil airports and military airfields in New Jersey. These requests are considered serious because of the potential for loss of human life and because damage to aircraft can be extremely expensive. With the implementation of an Integrated MDM program in New Jersey, WS could provide direct management and technical wildlife hazard management assistance at the request of the aviation community in New Jersey.

### **1.3.2 Need for Mammal Damage Management to Protect Agricultural Resources**

Livestock and dairy production in NJ contribute substantially to the State's economy. In 2001, NJ feedlot operators maintained 44,000 cattle and calves valued at an estimated \$44.9 million (NJDA 2003a). Milk production in NJ totaled 233 million pounds in 2001, valued at an estimated \$37.5 million. The leading milk producing counties were Salem, Sussex, Warren, Burlington, and Hunterdon. There were an estimated 13,000 milk cows, 8,000 beef cows, and 13,000 hogs and pigs in NJ during 2001.

The NJDFW Wildlife Control Unit receives requests for assistance from NJ citizens experiencing agricultural damage problems from mammals, including, but not limited to the following damage scenarios: 1. predation on livestock, including poultry, from black bears, coyotes and foxes, 2. threat and occurrence of injury to horses and other farm animals due to woodchuck borrows and holes, and 3. other problems. An additional concern in New Jersey is the potential for animal diseases to affect livestock. Two of these diseases, Foot-and-Mouth Disease and pseudorabies affect agricultural animals and have a wildlife component. Containment or eradication of these diseases to protect NJ agricultural and natural resource interests could include wildlife damage management activities conducted by WS in cooperation with the APHIS Veterinary Services (VS) program, NJDFW and NJDA or other governmental agencies.

Foot and Mouth Disease (FMD) is a severe, highly contagious vesicular viral disease of cloven-hoofed animals, including, but not limited to, cattle, swine, sheep, goats, and deer. The disease is rarely fatal in adult animals, although mortality in young animals may be high. FMD is endemic in Africa, Asia, South America, and parts of Europe but the United States has been free of FMD since 1929. Although it is often not fatal, FMD causes severe losses in the production of meat and milk and therefore has grave economic consequences. FMD does not infect humans or horses, however, both could potentially transmit the virus.

While FMD is primarily an economically devastating disease of livestock, experimental studies have clearly demonstrated that it also threatens wildlife. North American wildlife that are susceptible to FMD include white-tailed deer, other deer species, feral pigs, bison, moose, antelope, musk ox, caribou, sheep, and elk. Most free-living North American wildlife have had no previous virus exposure, and there is little information available about their vulnerability (USGS NWHC 2001). Each state in the U.S. is or has developed its own FMD emergency response plan. Appendix C of the State of New Jersey Emergency Operations Plan (Emergency Support Function #17) details the response protocol should FMD either be suspected or confirmed in NJ. In the event of FMD outbreak in New Jersey state officials will contact the USDA WS NJ office to notify of a possible request for assistance from a field location if assessments warrant such a request.

Pseudorabies (PRV) is a disease of swine that can also affect cattle, horses, dogs, cats, sheep, and goats. The disease is caused by the pseudorabies virus, an extremely contagious herpes virus that causes reproductive problems, including abortion, stillbirths, and even occasional death in breeding and finishing hogs. The United States is one of the world's largest producers of pork and is the second largest exporter of pork. U.S. pork production accounts for about 10 percent of the total world supply. The retail value of pork sold to consumers exceeds \$30 billion annually. In addition, the pork industry supports more than 600,000 jobs. PRV costs U.S. pork producers about \$40 million annually in lost production as well as testing and vaccination costs. (USDA 2000a). Pseudorabies in recent years has been found in Iowa, Tennessee, and New Jersey. NJ achieved Stage V (free) status by October, 2003. States may advance to Stage V (free status) if that state has been free of PRV for one year in recognition of Stage IV status (NJDA 2003b).

WS would conduct and assist in management efforts involving dogs, deer, and other mammals, coordinated by or with the NJDFW, NJDA and/or other Federal and State agencies, to control the occurrence and spread of these and other animal diseases to protect livestock and other agricultural resources throughout the state of New Jersey.

There are five major fruit and berry crops grown in NJ: apples, blueberries, cranberries, peaches, and strawberries (NJDA 2003a). Total production during 2001 amounted to 226 million pounds, with the value of utilized production estimated at \$82.4 million. Fresh market vegetables total value during 2001 was \$139 million. Production value was greatest for Jersey Fresh tomatoes (\$28 million), bell peppers (\$27.8 million), sweet corn (\$15.7 million), and cucumbers (\$9.45 million). Total value of NJ field crops during 2001 was \$64 million, with greatest values occurring for hay (\$27.9 million), corn for grain (\$14.8 million), and soybeans for beans (\$12.7 million). In New Jersey, mammal damage to agricultural resources reported to the NJDFW Wildlife Control Unit includes, but is not limited to, the following damage scenarios:

1. consumption of truck crops (tomatoes, pumpkins, squash, beans, etc.), field and sweet corn, flowers, hay, soybeans, other small grains, and other crops, by white-tailed deer,
2. deer damage to Christmas trees, nursery stock, and orchard trees due to antler rubbing and bite damage to terminal buds,
3. puncturing of sod by deer hooves,
4. damage to orchard trees and nursery stock from deer browsing,
5. consumption of truck crops by woodchuck,
6. consumption and physical damage to corn and plants by bears and raccoons,
7. flooding of agricultural fields by beaver activity,
8. damage to nursery stock from chewing by beavers,
- and 9. bark chewing and girdling on orchard trees by rabbits and field rodents.

Voles are reported to damage orchard trees by gnawing. Trees are badly damaged or the bark is girdled and trees die when feeding by rabbits and voles is severe. Similar damage occurs in nurseries which grow landscape ornamentals and shrubs.

Red foxes, gray foxes, coyotes, black bears and feral dogs can cause predation losses or injury to livestock (e.g. sheep, goats, cattle, pigs, horses) and poultry (e.g. chickens, turkeys, geese ducks). Sheep and lamb losses from predators in the U.S. totaled 273,000 head and \$16.5 million during 1999 (NASS 2000). Coyotes and dogs accounted for 60.7% and 15.1% of these predator losses, respectively. In 2000, cattle and calf losses from predators in the U.S. totaled 147,000 head and \$51.6 million (NASS 2001). Coyotes and dogs accounted for 64.6% and 17.7% of these predator losses, respectively. Coyotes were also the most commonly reported predator of goats in the U.S., accounting for 35.6% of predator losses (NASS 2000). The value of goats lost from all predators in the U.S. in 1999 was \$3.4 million. Cattle and calves are most vulnerable to predation at calving time and less vulnerable as they get older and larger (Horstman and Gunson 1982).

Rats (*Rattus spp.*) cause damage to stored grain through feeding and contamination with droppings. They may damage crops in fields and containers and packaging materials in stored food. They cause structural damage to commodity storage structures and foundations, etc. by burrowing and gnawing.

The domestic cat has been found to transmit *Toxoplasma gondii* to both domestic and wild animal species. Fitzgerald et al. (1984) documented that feral and free-ranging cats transmitted *T. gondii* to sheep in New Zealand, resulting in abortion in ewes. The authors also found *Sarcocystis* spp. contamination in the musculature of sheep. Dubey et al. (1995) found cats to be 68.3% positive for seroprevalence of *Toxoplasma gondii* on swine farms in Illinois and the major reservoir for this disease. The main sources for infecting cats are thought to be birds and mice. Cats have been found to be important reservoirs and the only species known to allow for the completion of the life cycle for the protozoan parasite, *Toxoplasmosis gondii* (Dubey 1973; Teutsch et al. 1979). Both stray and domiciled cats may be infected by this protozoan, but this infection is more common in stray cats. Diseases that may be communicable from free-ranging or feral cats to pet cats include feline panleukopenia (FPL) infection, feline calicivirus (FCV) infection, feline reovirus (FRV) infection, and feline syncytium-forming virus (FSV) infection (Gillespie and Scott 1973). Of the four feline diseases, feline panleukopenia is considered to be the most serious. Reif (1976) found that during the acute stages of feline panleukopenia, fleas were vectors of this disease to other cats. FPL infection is cyclic in nature, being more prevalent in the July to September time period.

### 1.3.3 Need for Mammal Damage Management to Protect Property

In NJ during FY 2001-2003, mammal damage to property has been reported to WS involving the following species: woodchuck (damage to vegetable gardens, turf, and residential buildings), gray squirrel (damage to vegetable gardens, residential buildings, and vehicles), porcupines (damage to turf, and flowers), raccoons and bears (damage to residential buildings, and other property), coyotes (predation on pets), beaver (property), skunks (landscaping, property), moles (general property damage), and other mammal species. The NJDFW WCU receives requests from the public in situations where deer, beaver, coyote and other mammals are causing property damage. Frequently-reported damage involving these species are listed here: white-tailed deer (grazing of landscaping and flowers), beaver (loss of trees, flooding yards), and coyote (predation on pets) (T.McBride, NJDFW, Pers. Comm. 2004).

Most of the damage caused by beaver is a result of dam building, bank burrowing, tree cutting, obstructing overflow structures and spillways, or flooding. Some cases of beaver damage include roads being flooded, reservoir dams being destroyed by bank den burrows, and train derailments being caused by continued flooding and burrowing (Miller and Yarrow 1994). Housing developments have been threatened by beaver dam flooding. Some small bridges also have been destroyed because of beaver dam-building activity. Miller (1983) estimated that the annual damage by beavers in the United States was \$75-\$100 million. The estimated value of beaver damage is perhaps greater than that of any other single wildlife species in the U.S. with economic damage estimated to have exceeded \$4 billion in the southeastern U.S. over a 40-year period (Arner and Dubose 1980). In some southeastern states, losses from beaver damage have been estimated at \$3 million to \$5 million dollars annually (Miller and Yarrow 1994), with timber losses as the most common type of damage (Hill 1982). Tracts of bottomland hardwood timber up to several thousand acres in size may be lost to beaver activity (Miller and Yarrow 1994). Surveys in North Carolina and Alabama indicate that the majority of landowners with beaver damage on their property desire damage

management via beaver removal (Hill 1976, Lewis 1979, Woodward et al. 1985). Loker et al. (1999) found that suburban residents also may desire lethal management methods to resolve beaver damage conflicts. Such conflicts, which are viewed as "damage," result in adverse impacts that often outweigh benefits (Miller and Yarrow 1994). Beaver often inhabit sites in or adjacent to urban/suburban areas and cut or girdle trees and shrubs in yards, undermine yards and walkways by burrowing, flood homes and other structures, destroy pond and reservoir dams by burrowing into levees, gnaw on boat houses and docks, and cause other damage to private and public property (Wade and Ramsey 1986). Additionally, roads and railroads may be damaged by saturation of the roadbed from beaver flooding or by beaver burrowing into the banks that comprise roadbeds and railroad beds.

#### 1.3.4 Need for Mammal Damage Management to Protect Natural Resources

Natural resources may be described as those assets belonging to the public and often managed and held in trust by government agencies for citizens. Such resources may be plants or animals, including threatened and endangered species, historic properties, or habitats in general. Examples of natural resources in New Jersey are historic structures and places; parks and recreation areas; natural areas, including unique habitats or topographic features; threatened and endangered plants or animals; and any plant or animal populations which have been identified by the public as a natural resource.

Examples of mammal damage to natural resources is vegetation at a park which is being damaged by excessive browsing by overabundant white-tailed deer populations, or ground-nesting game bird populations which are being decimated by the presence of mammal predators such as raccoons, coyotes, or foxes.

Need to Protect T&E Species. Massey (1971) and Massey and Atwood (1979) found that predators can prevent least terns (*Sterna antillarum*) from nesting or cause them to abandon previously occupied sites. In another study, mammal predators were found to have significantly impacted the nesting success of least terns on sandbars and sandpits (Kirsch 1996). Skunks (Massey and Atwood 1979), red foxes (Minsky 1980), coyotes (Grover and Knopf 1982), and raccoons (Gore and Kinnison 1991) are common predators of least terns. During one 2-year study, coyotes destroyed 25.0-38.5% of all interior least tern nests (Grover 1979). Raccoons are considered a major predator of ground-nesting upland bird nests and poults (Speake 1980, Speake et al. 1985, Speake et al. 1969). In Massachusetts, predators destroyed 52-81% of all active piping plover (*Charadrius melodus*) nests from 1985-1987 (MacIvor et al. 1990). Red foxes accounted for 71-100% of the nests destroyed by predators at the site. Balser et al. (1968) recommended that predator damage management programs target the entire predator complex or compensatory predation may occur by a species not under control, a phenomena also observed by Greenwood (1986). Trautman et al. (1974) concluded that a single species predator damage management program showed some promise for enhancing ring-necked pheasant (*Phasianus colchicus*) populations. Predator damage management can be an important tool for achieving and maintaining game, nongame, and T&E species production and management objectives.

Nationwide in FY 2003, the WS program actively protected 174 Federal and State listed threatened and endangered species from wildlife damage in 28 states, including New Jersey. More than 95 percent of these projects resulted in the increase or maintenance of local threatened and endangered species populations. In 2001, Alaska's Aleutian Canada goose (*Branta canadensis leucopareia*) was officially removed from the list of federally threatened species, due in part to WS' efforts to prevent predation by the arctic fox (*Alopex lagopus*). In Florida alone, WS protects 14 threatened and endangered species, including five species of sea turtles from raccoon, coyote, and skunk predation (B. Constantin, WS, pers. comm., 2003). Other instances where WS was requested to assist in developing programs to safeguard the survival of endangered species include protection of adult and young least terns and snowy plovers (*Charadrius alexandrinus*) in California from predation by raccoons, coyotes, and skunks (J. Turman, M. Jensen WS, pers. comm., 2003), protection of juvenile salmonoids (steelhead and salmon) in Washington from river otters (*Lutra canadensis*) (B. Dunlap, K. Gruver, WS, pers. comm., 2003), protection of Sierra Nevada Bighorn sheep (*Ovis canadensis*) from mountain lion (*Felis concolor*) predation in California (B. Dunlap, WS, pers. comm., 2003).

Some of the species listed as threatened or endangered under the Endangered Species Act of 1973 and New Jersey Endangered Species Conservation Act are preyed upon or otherwise adversely affected by certain mammal species. Piping plovers (Federally threatened, State endangered), least terns (State endangered), and black skimmers (State threatened, non-breeding population and State endangered, breeding population) can be negatively affected by raccoons, opossums, striped skunks, and other mammals that prey on birds, eat eggs, and cause disturbances on nesting sites. The Atlantic Coast Piping Plover Recovery Plan (USFWS 1996) identifies increased predation as one of the top three causes of the decline of the piping plover population. During 2002, the NJDFW ENSP determined that predation accounted for 21.2% of piping plover nest failures; ENSP conducts predation management activities (nest exclosures, supplemental electric fencing, management of feral and pet dogs and cats, etc.) at many of the NJDFW-managed plover nesting sites in the State. In NJ, WS has implemented successful mammal predation management programs to benefit piping plovers and other shorebirds at Forsythe NWR (since 1996), U.S. Coast Guard Training Center (since 2001), and the Cape May NWR (since 2003, and as Forsythe NWR since 2001) (see Section 3.2.2.1). WS predation management programs to protect rare species are one component of integrated programs that also include nest exclosures, management of public access and impacts and other methods.

Other instances where mammals may damage or negatively affect natural resources include, but are not limited to, over browsing by deer in forest habitats, damage to wetland and stream banks by muskrat and burrowing mammals, and beaver damage to timber, seedlings, and other vegetation in natural areas, parks, and private properties. Patterson (1951) and Avery (1992) reported the presence of beaver dams can negatively affect fisheries. Beaver dams may adversely affect stream ecosystems by increasing sedimentation in streams, and thereby negatively affect wildlife that depend on clear water. WS could provide technical advice and operational MDM involving mammal species that pose a threat to natural resources, including threatened and endangered wildlife, to any requester experiencing such damage anywhere in New Jersey.

Need to Protect Natural Resources, Including Wildlife, from Disease. Chronic wasting disease (CWD) of mule deer, Rocky Mountain elk and white-tailed deer is a disease most commonly believed caused by infectious protein particles, otherwise known as prions. CWD is a member of the group of diseases known as transmissible spongiform encephalopathies (TSEs). Scrapie, "Mad Cow Disease", transmissible mink encephalopathy, and the human variant Creutzfeldt-Jakob disease (CJD) are other known TSEs. In infected animals, the brain takes on a sponge-like appearance and symptoms may include head tremors, walking repetitive courses, wide-based stance, gradual loss of body condition, and excessive drinking, urination, and salivation. Death is inevitable once clinical disease occurs (Doster 2002).

CWD in wild free-ranging deer and elk is known to exist in Colorado, Wyoming, Nebraska, South Dakota, Wisconsin, New Mexico, and Illinois. CWD in game farm elk and deer has been found in Colorado, Wisconsin, Montana, South Dakota, Oklahoma, Kansas, Nebraska, Minnesota, Alberta, and Saskatchewan. Although CWD has not been found in New Jersey, state and federal agencies are continuing surveillance as captive deer herds still pose a risk factor. Deer illegally imported into New Jersey from Wisconsin (where CWD is present) to stock captive game farms has increased the threat of CWD to New Jersey. Based on sampling of hunter harvested deer conducted by New Jersey Division of Fish and Wildlife, USDA Veterinary Services and Wildlife Services, and NJ Dept of Agriculture, it has so far been concluded that if CWD were present in New Jersey there is a 99% confidence that it is in less than 1% of the adult deer (D. Roscoe, NJ Division of Fish and Wildlife, Pers. Comm. 2003).

There currently is no convincing evidence that CWD affects humans. Public health officials do however recommend that human exposure to CWD be avoided as they continue to evaluate any potential risk.

If it were to occur in NJ, management of chronic wasting disease would be focused on natural resource protection by controlling/eliminating the spread of the disease to the native NJ white-tailed deer herd. This work would be coordinated by the NJDFW, and may include monitoring, biological sampling and research, capture, euthanasia, and/or lethal control of white-tailed deer, as well as other activities. WS involvement in a chronic wasting disease management program in NJ would be as requested by NJDFW, and would

include use of lethal and nonlethal deer and other wildlife management methods to accomplish disease management and natural resource protection objectives.

#### 1.4 RELATIONSHIP TO OTHER ENVIRONMENTAL DOCUMENTS

**ADC Programmatic Environmental Impact Statement.** WS, previously called Animal Damage Control (ADC), has issued a Final EIS on the national APHIS/WS program (USDA 1997). Pertinent and current information available in the EIS has been incorporated by reference into this EA.

**Wildlife Services Canada Goose Damage Management Environmental Assessment and Finding of No Significant Impact.** In 2002, the WS program issued a Finding of No Significant Impact and a Final Environmental Assessment entitled, "Canada Goose Damage Management in New Jersey," which evaluated alternatives and impacts to the environment and selected an Integrated Wildlife Damage Management (IWDM) approach to manage damage associated with Canada geese in NJ (USDA 2002).

**Wildlife Services Bird Damage Management Environmental Assessment and Finding of No Significant Impact.** In 2003, the WS program issued a Finding of No Significant Impact and a Final Environmental Assessment entitled, "Reducing Bird Damage Through an Integrated Wildlife Damage Management Program in the State of New Jersey," which evaluated alternatives and impacts to the environment and selected an Integrated Wildlife Damage Management (IWDM) approach to manage damage associated with birds in NJ (USDA 2003).

**Wildlife Services Deer Management Environmental Assessment and Finding of No Significant Impact.** In 2000, the WS NJ program issued a Finding of No Significant Impact and a Final Environmental Assessment entitled, "Shooting White-tailed Deer to Contribute to Deer Population Reduction Objectives in New Jersey," which evaluated alternatives and impacts to the environment and selected an Integrated Wildlife Damage Management (IWDM) approach to achieve deer management objectives in NJ (USDA 2000b). The 2000 WS deer EA is hereby replaced with this current (2004) EA, which evaluates deer management activities of WS in NJ.

**Wildlife Services Rabies Management Environmental Assessment and Finding of No Significant Impact.** In 2001, the WS program issued a Finding of No Significant Impact and a Final Environmental Assessment entitled, "Oral Vaccination to Control Specific Rabies Virus Variants in Raccoons, Gray Foxes, and Coyotes in the United States," which analyzed the environmental effects of APHIS WS involvement in the funding of and participation in oral rabies vaccination programs to eliminate or stop the spread of rabies in a number of eastern states (including New Jersey) and gray fox and coyote rabies in Texas (USDA 2001). APHIS WS determined the action would not have any significant impact on the quality of the human environment. Pertinent information from this document has been incorporated by reference into this EA.

#### 1.5 WS RECORD KEEPING REGARDING REQUESTS FOR MAMMAL DAMAGE MANAGEMENT ASSISTANCE

WS maintains a Management Information System (MIS) database to document assistance that the agency provides in addressing wildlife damage conflicts. MIS data is limited to information that is collected from people who have requested services or information from Wildlife Services. It does not include requests received or responded to by local, State or other Federal agencies, and it is not a complete database for all wildlife damage occurrences. In NJ, the NJDFW has management responsibility to manage resident mammals, and conducts mammal management programs for species such as furbearers, game species, and nongame mammals. Therefore, the majority of mammal damage management requests for assistance from the public are directed to the NJDFW Wildlife Control Unit (bear, deer, beaver, coyote, woodchucks, etc.) or the NJDFW ENSP (moles, chipmunks, voles, etc.). The number of requests for assistance to WS does not necessarily reflect the extent of need for action, but this data does provide an indication that needs exists.

The WS database includes, but is not limited to, the following information: species of wildlife involved, the number of individuals involved in a damage situation; tools and methods used or recommended to alleviate the conflict; and the resource that is in need of protection. Table 1-2 provides a summary of Technical Assistance projects completed by the New Jersey WS program for Fiscal Years 1998-2003. A description of the WS Direct Control and Technical Assistance programs is contained in Chapter 3 of this EA.

**Table 1-2\*. Annual number of incidents for technical assistance involving mammals for New Jersey Wildlife Services during 1998-2003.**

Fiscal Year	Agriculture	Human Health and Safety	Property	Natural Resources	Total
1998	1	1	11	0	13
1999	0	5	5	2	12
2000	0	1	16	0	17
2001	0	0	12	0	12
2002	1	0	6	2	9
2003	0	0	10	0	10
Total	2	7	60	2	71

Data presented in this table were taken from NJ WS Annual Program Reports and represent the number of technical assistance projects conducted by the NJ WS program and do not include data from operational projects conducted during the time period covered

## 1.6 PROPOSED ACTION

The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) proposes to continue the current damage management program that responds to mammal damage in the State of New Jersey. WS involvement in mammal damage management in New Jersey is closely coordinated with the New Jersey Division of Fish and Wildlife, and WS take of mammals is authorized through permits and/or other authorities. An Integrated Wildlife Damage Management (IWDM) approach would be implemented to reduce mammal damage to property, agricultural resources, and natural resources, and to reduce mammal impacts on human/public health and safety. Damage management would be conducted on public and private property in New Jersey when the resource owner (property owner) or manager requests assistance. An IWDM strategy would be recommended and used, encompassing the use of practical and effective methods of preventing or reducing damage while minimizing harmful effects of damage management measures on humans, target and non-target species, and the environment. Under this action, WS could provide technical assistance and direct operational damage management, including non-lethal and lethal management methods by applying the WS Decision Model (Slate et al. 1992). When appropriate, physical exclusion, habitat modification or harassment would be recommended and utilized to reduce damage. In other situations, mammals would be removed as humanely as possible using shooting, trapping, and registered pesticides and other products. In determining the damage management strategy, preference would be given to practical and effective non-lethal methods. However, non-lethal methods may not always be applied as a first response to each damage problem. The most appropriate response could often be a combination of non-lethal and lethal methods, or could include instances where application of lethal methods alone would be the most appropriate strategy.

## 1.7 DECISION TO BE MADE

Based on the scope of this EA, the decisions to be made are:

- Should WS implement an integrated mammal damage management strategy, including technical assistance and direct control, to meet the need for mammal damage management in New Jersey?

- If not, should WS attempt to implement one of the alternatives to an integrated mammal damage management strategy as described in the EA?
- Would the proposed action have significant impacts on the quality of the human environment, requiring preparation of an EIS?

## 1.8 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT ANALYSIS

### 1.8.1 Actions Analyzed

This EA evaluates mammal damage management by WS to protect: 1) property; 2) agricultural resources; 3) natural resources; and 4) public health and safety in New Jersey. Protection of other resources or other program activities would be addressed in other NEPA analysis, as appropriate.

### 1.8.2 American Indian Lands and Tribes

Currently, New Jersey WS does not have any MOUs with any American Indian tribes. If WS enters into an agreement with a tribe for MDM, this EA would be reviewed and supplemented, if appropriate, to insure compliance with NEPA. MOUs, agreements and NEPA documentation would be prepared as appropriate before conducting MDM on tribal lands.

### 1.8.3 Period for which this EA is Valid

This EA would remain valid until the WS program in New Jersey and other appropriate agencies determine that new needs for action, changed conditions or new alternatives having different environmental effects must be analyzed. At that time, this analysis and document would be supplemented pursuant to NEPA. Review of the EA would be conducted each year to ensure that the EA is sufficient.

### 1.8.4 Site Specificity

This EA analyzes the potential impacts of MDM and addresses activities on all lands in New Jersey under MOUs, Cooperative Agreements and in cooperation with the appropriate public land management agencies. It also addresses the impacts of MDM on areas where additional agreements may be signed in the future. Because the proposed action is to reduce damage and because the program's goals and directives are to provide services when requested, within the constraints of available funding and workforce, it is conceivable that additional MDM efforts could occur. Thus, this EA anticipates this potential expansion and analyzes the impacts of such efforts as part of the program.

Planning for the management of mammal damage must be viewed as being conceptually similar to federal or other agency actions whose missions are to stop or prevent adverse consequences from anticipated future events for which the actual sites and locations where they will occur are unknown but could be anywhere in a defined geographic area. Examples of such agencies and programs include fire and police departments, emergency clean-up organizations, insurance companies, etc. Although some of the sites where mammal damage will occur can be predicted, all specific locations or times where such damage will occur in any given year cannot be predicted. This EA emphasizes major issues as they relate to specific areas whenever possible, however, many issues apply wherever mammal damage and resulting management occurs, and are treated as such. The standard WS Decision Model (Slate et al. 1992) would be the site-specific procedure for individual actions conducted by WS in New Jersey (see Chapter 3 for a description of the Decision Model and its application).

The analyses in this EA are intended to apply to any action that may occur *in any locale* and at *any time* within the State of New Jersey. In this way, APHIS-WS believes it meets the intent of NEPA with regard to site-specific analysis and that this is the only practical way for WS to comply with NEPA and still be able to accomplish its mission.



### **1.8.5 Summary of Public Involvement**

Issues related to the proposed action were initially developed by WS. Issues were defined and preliminary alternatives were identified. As part of this process, and as required by the Council on Environmental Quality (CEQ 1981) and APHIS-NEPA implementing regulations, this document and its Decision are being made available to the public through "Notices of Availability" (NOA) published in local media and through direct mailings of NOA to parties that have specifically requested to be notified. New issues or alternatives raised after publication of public notices will be fully considered to determine whether the EA and its Decision should be revisited and, if appropriate, revised.

### **1.9 PREVIEW OF THE REMAINDER OF THIS EA**

The remainder of this EA is composed of four (4) chapters and six (6) appendices. Chapter 2 discusses and analyzes the issues and affected environment. Chapter 3 contains a description of each alternative, alternatives not considered in detail, mitigation, and standard operating procedures (SOP). Chapter 4 analyzes environmental consequences and the environmental impacts associated with each alternative considered in detail. Chapter 5 contains the list of preparers and those consulted during this EA process. Appendix A is a list of the literature cited during the preparation of the EA and Appendix B is a detailed description of the methods used for MDM in New Jersey. Appendices C-F are comprehensive lists of Federal and NJ T&E species and correspondence with the NJDFW and FWS regarding T&E species.

## CHAPTER 2: ISSUES AND AFFECTED ENVIRONMENT

### 2.0 INTRODUCTION

Chapter 2 contains a discussion of the issues, including issues that received detailed environmental impact analysis in Chapter 4 (Environmental Consequences), issues used to develop mitigation measures and SOPs, and issues not considered in detail, with the rationale. Pertinent portions of the affected environment are included in this chapter and in the discussion of issues used to develop mitigation measures. Additional affected environments are incorporated into the discussion of the environmental impacts in Chapter 4 and the description of the proposed program in Chapter 3.

### 2.1 AFFECTED ENVIRONMENT

The areas of the proposed action could include areas in and around commercial, industrial, public, and private buildings, facilities and properties and at other sites where mammals burrow, feed, or otherwise occur. Examples of areas where mammal damage management activities could be conducted are, but are not necessarily limited to: agricultural fields, vineyards, orchards, farmyards, dairies, ranches, livestock operations, waste handling facilities, industrial sites, natural areas, government properties and facilities, private homes and properties, corporate properties, schools, hospitals, parks and recreation areas, swimming lakes, communally-owned homeowner/property owner association properties, natural areas, wildlife refuges, wildlife management areas, coastal and tidal beaches, ponds, rivers, and inlets, airports and surrounding areas.

### 2.2 ISSUES ANALYZED IN DETAIL IN CHAPTER 4

The following issues have been identified as areas of concern requiring consideration in this EA. These will be analyzed in detail in Chapter 4:

- Effects on target mammal species
- Effects on other wildlife species, including T&E species
- Effects on human health and safety
- Impacts to stakeholders, including aesthetics
- Humaneness and animal welfare concerns of methods used

#### 2.2.1 Effects on Target Mammal Species

Of interest to WS, program recipients, decision-makers, and members of the public is whether wildlife damage management actions adversely affect the viability of target species populations. The target species selected for analysis in this EA include: white-tailed deer (*Odocoileus virginianus*), woodchuck (*Marmota monax*), raccoon (*Procyon lotor*), opossum (*Didelphus marsupialis*), muskrat (*Ondatra zibethicus*), beaver (*Castor Canadensis*), red fox (*Vulpes vulpes*), striped skunk (*Mephitis mephitis*), gray fox (*Urocyon cinereoargenteus*), Eastern coyote (*Canis latrans*, var.), porcupine (*Erethizon dorsatum*), gray squirrel (*Sciurus carolinensis*), red squirrel (*Tamiasciurus hudsonicus*), domestic/feral dog (*Canis familiaris*), brown (Norway) rat (*Rattus norvegicus*), black (roof) rat (*Rattus rattus*), as well as feral cat (*Felis sp.*), Eastern mole (*Scalopus aquaticus*), star-nosed mole (*Condylura cristata*), short-tailed shrew (*Blarina brevicauda*), house mouse (*Mus musculus*), deer mouse (*Peromyscus maniculatus*), white-footed mouse (*Peromyscus leucopus*), woodland jumping mouse (*Napaeozapus insignis*), meadow jumping mouse (*Zapus hudsonius*), meadow vole (*Microtus pennsylvanicus*), pine vole (*Microtus pinetorum*), and red-backed mouse (*Clethrionomys gapperi*).

### **2.2.2 Effects on Other Wildlife Species, including T&E Species**

WS and the rest of the wildlife management profession, as well as the public, are concerned about whether the proposed action or any of the alternatives might result in adverse impacts to populations of other wildlife, especially threatened and endangered (T&E) species. WS' mitigation measures and SOPs are designed to reduce the effects on non-target species' populations and are presented in Chapter 3. To reduce the risks of adverse affects to non-target species, WS would select damage management methods that are target-selective or apply such methods in ways to reduce the likelihood of capturing or killing non-target species.

Threatened and Endangered species lists for the USFWS and State of New Jersey were reviewed to identify potential effects on federal and state listed T&E species. Special efforts are made to avoid jeopardizing T&E species through biological evaluations of the potential effects and the establishment of special restrictions or mitigation measures. WS has consulted with the USFWS under Section 7 of the ESA concerning potential effects of MDM methods on T&E species and has obtained a Biological Opinion (B.O.). For the full context of the B.O., see Appendix F of the ADC FEIS (USDA 1997). WS also consulted with the USFWS NJ Field Office under Section 7 during this EA process, to ensure that potential effects on T&E species were adequately addressed (correspondence in Appendix D).

Some members of the public are concerned that the use of registered toxicants to reduce mammal damage would have adverse impacts on other wildlife species, including T&E species. Based on a thorough Risk Assessment, APHIS concluded that when WS program chemicals are used according to label directions, they are selective to target individuals or populations, and such use has negligible impacts on the environment (USDA 1997, Appendix P). Under the alternatives proposed in this EA, the primary toxicants proposed for use and recommendation by WS are gas cartridges and zinc phosphide (ZP). Appendix B contains detailed descriptions of these chemical products.

Some MDM programs conducted by WS in NJ are directed at protection of T&E wildlife species. Operational mammal damage management programs conducted by WS at Federal properties (USFWS Wildlife Refuges and US Coast Guard property) in NJ benefit piping plovers, least terns and black skimmers by reducing predation on these species and their eggs, from raccoons, opossum, red fox, and other mammals. These efforts have contributed to integrated management programs that have included nest enclosures, control of human access, and electrified fencing implemented by landowning agencies, and have resulted in stable and increasing productivity and production of these rare bird species on the project areas. Predation management programs conducted by WS in NJ to benefit T&E wildlife species are described in Section 3.2.2.1.

### **2.2.3 Effects on Human Health and Safety**

#### ***Safety and efficacy of chemical control methods.***

Some individuals may have concerns that chemicals used for wildlife damage management should not be used because of potential adverse effects on people from being exposed to the chemicals directly or to the animals that have died as a result of the chemical use.

Under the alternatives proposed in this EA, pesticide products proposed for use by WS are gas cartridges and Zinc Phosphide. The EPA through FIFRA regulates their use, by NJDEP Pesticide Control Program and NJ state law (N.J.A.C. Title 7 Chapter 30 Subchapters 1-12), and by WS Directives. The use of registered chemical toxicants and repellants for mammal damage management poses no risk to public health and safety when applied according to label instructions. Based on a thorough Risk Assessment, APHIS concluded that when WS program chemicals are used according to label directions, they are selective to target individuals or populations, and such use has negligible impacts on the environment (USDA 1997, Appendix P). WS personnel who apply pesticides are certified pesticide applicators and apply pesticides according to label

instructions. A detailed description of these chemicals and their potential effects is contained in Appendix B.

Other individuals may have concerns that there is a potential for drugs used in animal capture, handling, and euthanasia to cause adverse health effects in humans that hunt and eat the species involved. Among the species to be captured and handled under the proposed action, this issue is expected to only be of concern for wildlife which are hunted and sometimes consumed by people as food.

#### ***Impacts on human safety of non-chemical MDM methods***

Some people may be concerned that WS's use of firearms, traps, snares and pyrotechnic scaring devices could cause injuries to people. WS personnel occasionally use traps, snares and firearms to remove mammals that are associated with damage. There is some potential fire hazard to agricultural sites and private property from pyrotechnic use.

Firearm use is a very sensitive public concern because of safety relating to the public and the threat of misuse. To ensure safe use and awareness, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within 3 months of their appointment and a refresher course every 2 years afterwards (WS Directive 2.615). WS employees who carry firearms as a condition of employment, are required to sign a form certifying that they meet the criteria as stated in the *Lautenberg Amendment* which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence.

#### ***Impacts on human health and safety from mammals***

The concern stated here is that the absence of adequate MDM would result in adverse effects on human health and safety, because mammal damage would not be curtailed or reduced to the minimum levels possible and practical. The potential impacts of not conducting such work could lead to increased incidence of injuries, illness, or loss of human lives.

### **2.2.4 Impacts to Stakeholders, including Aesthetics**

Aesthetics is a philosophy dealing with the nature of beauty, or the appreciation of beauty. Therefore, aesthetics is subjective in nature and is dependent on what an observer regards as beautiful. The human attraction to animals has been well documented throughout history and started when humans began domesticating animals. The American public is no exception, and today a large percentage of households have pets. However, some people may consider individual wild animals and birds as "pets" or exhibit affection toward these animals, especially people who enjoy coming in contact with wildlife. Therefore, the public reaction is variable and mixed to wildlife damage management because there are numerous philosophical, aesthetic, and personal attitudes, values, and opinions about the best ways to reduce conflicts/problems between humans and wildlife. There may be some concern that the proposed action or alternatives would result in the loss of aesthetic benefits to the public, resource owners, or neighboring residents. Wildlife generally is regarded as providing economic, recreational, and aesthetic benefits (Decker and Goff 1987), and the mere knowledge that wildlife exists is a positive benefit to many people.

Wildlife populations provide a range of social and economic benefits (Decker and Goff 1987). These include direct benefits related to consumptive and non-consumptive use (e.g., wildlife-related recreation, observation, harvest, sale), indirect benefits derived from vicarious wildlife related experiences (e.g., reading, television viewing), and the personal enjoyment of knowing wildlife exists and contributes to the natural ecosystems (e.g., ecological, existence, bequest values) (Bishop 1987). Direct benefits are derived from a user's personal relationship to animals and may take the form of direct consumptive use (using the animal or intending to) or non-consumptive use (viewing the animal in nature or in a zoo, photography)

(Decker and Goff 1987). Indirect benefits or indirect exercised values arise without the user being in direct contact with the animal and come from experiences such as looking at photographs and films of wildlife, reading about wildlife, or benefiting from activities or contributions of animals such as their use in research (Decker and Goff 1987). Indirect benefits come in two forms: bequest and pure existence (Decker and Goff 1987). Bequest is providing for future generations and pure existence is merely knowledge that the animals exist (Decker and Goff 1987).

Many people, directly affected by problems and threats to public health or safety associated with mammals, insist upon their removal from the property or public location when they cause damage. Some members of the public have an idealistic view and believe that all wildlife should be captured and relocated to another area to alleviate damage or threats to public health or safety. Others, directly affected by the problems caused by wildlife, strongly support removal. Individuals not directly affected by the harm or damage caused by wildlife may be supportive, neutral, or totally opposed to any removal of wildlife from specific locations or sites. Those totally opposed to mammal damage management want WS to teach tolerance for damage and threats to public health or safety, and that wildlife should never be killed. Some people would strongly oppose removal of mammals regardless of the amount and type of damage. Some members of the public who oppose removal of wildlife do so because of human-affectionate bonds with individual animals. These human-affectionate bonds are similar to attitudes of a pet owner and result in aesthetic enjoyment.

The WS program in New Jersey only conducts wildlife damage management at the request of the affected property owner or resource manager. If WS received requests from an individual or official for MDM, WS would address the issues/concerns and consideration would be made to explain the reasons why the individual damage management actions are being considered. Management actions would be carried out in a caring, humane, and professional manner.

#### **2.2.5 Humaneness and Animal Welfare Concerns of Methods Used**

Humaneness, in part, is a person's perception of harm or pain inflicted on an animal, and people may perceive the humaneness of an action differently.

The issue of humaneness and animal welfare, as it relates to the killing or capturing of wildlife is an important and very complex concept that can be interpreted in a variety of ways. Schmidt (1989) indicated that vertebrate pest damage management for societal benefits could be compatible with animal welfare concerns, if "... *the reduction of pain, suffering, and unnecessary death is incorporated in the decision making process.*" Suffering is described as a "... *highly unpleasant emotional response usually associated with pain and distress.*" However, suffering "... *can occur without pain . . . ,*" and "... *pain can occur without suffering . . .*" (AVMA 1987). Because suffering carries with it the implication of a time frame, a case could be made for "... *little or no suffering where death comes immediately . . .*" (CDFG 1991), such as shooting.

Defining pain as a component in humaneness of WS methods appears to be a greater challenge than that of suffering. Pain obviously occurs in animals. Altered physiology and behavior can be indicators of pain, and identifying the causes that elicit pain responses in humans would "... *probably be causes for pain in other animals . . .*" (AVMA 1987). However, pain experienced by individual animals probably ranges from little or no pain to considerable pain (CDFG 1991).

The AVMA states "... *euthanasia is the act of inducing humane death in an animal*" and "... *the technique should minimize any stress and anxiety experienced by the animal prior to unconsciousness.*" (AVMA 2001). Some people would prefer AVMA accepted methods of euthanasia to be used when killing all animals, including wild and feral animals. The AVMA states that "*For wild and feral animals, many of the recommended means of euthanasia for captive animals are not feasible. In field circumstances, wildlife biologists generally do not use the term euthanasia, but terms such as killing, collecting, or harvesting, recognizing that a distress-free death may not be possible.*" (AVMA 2001).

The decision-making process involves tradeoffs between the above aspects of pain and humaneness. Therefore, humaneness, in part, appears to be a person's perception of harm or pain inflicted on an animal, and people may perceive the humaneness of an action differently. One challenge with coping with this issue is how to achieve the least amount of animal suffering within the constraints of current technology and resources. WS has improved the selectivity and humaneness of management techniques through research and development. Research is continuing to bring new findings and products into practical use. Until new findings and products are found practical, a certain amount of animal suffering could occur when some MDM methods are used in situations where non-lethal damage management methods are not practical or effective.

New Jersey WS personnel are experienced and professional in their use of management methods so that they are humane within the constraints of current technology and resources. Mitigation measures and standard operating procedures used to maximize humaneness are described in Chapter 4.

## **2.3 ISSUES NOT CONSIDERED IN DETAIL WITH RATIONALE**

### **2.3.1 No Wildlife Damage Management at Taxpayer Expense; Wildlife Damage Management should be Fee Based**

Funding for WS comes from a variety of sources in addition to federal appropriations. In New Jersey, funds to implement wildlife damage management activities and programs are derived from a number of sources, including, but not limited to Federal, state, county and municipal governments/agencies, private organizations, corporations and individuals, homeowner/property owner associations, and others, under Cooperative Service Agreements and/or other contract documents and processes. Federal, state, and local officials have decided that wildlife damage management should be conducted by appropriating funds. WS was established by Congress as the agency responsible for providing wildlife damage management to the people of the United States. Wildlife damage management is an appropriate sphere of activity for government programs, since aspects of wildlife damage management are a government responsibility and authorized and directed by law.

### **2.3.2 Mammal Damage Should be Managed by Private Nuisance Wildlife Control Agents**

Private nuisance wildlife control agents could be contacted to reduce mammal damage for property owners or property owners could attempt to reduce their own damage problems. Some property owners would prefer to use a private nuisance wildlife control agent because the nuisance wildlife agent is located in closer proximity and thus could provide the service at less expense, or because they prefer to use a private business rather than a government agency. However, some property owners would prefer to contract with a government agency. In particular, large industrial businesses and cities and towns may prefer to use WS because of security and safety issues and reduced administrative burden.

### **2.3.3 Appropriateness of Preparing an EA (Instead of an EIS) for Such a Large Area**

Some individuals might question whether preparing an EA for an area the size of the State of New Jersey would meet the NEPA requirements for site specificity. If in fact a determination is made through this EA that the proposed action would have a significant environmental impact, then an EIS would be prepared. In terms of considering cumulative impacts, one EA analyzing impacts for the entire State may provide a better analysis than multiple EAs covering smaller zones. In addition, the WS program in New Jersey only conducts MDM on a relatively small area of the State where damage is occurring or likely to occur.

### **2.3.4 Effectiveness of Mammal Damage Management Methods**

A concern among members of the public is whether the methods of reducing mammal damage will be effective in reducing or alleviating damage and conflicts. The effectiveness of each method or methods can be defined in terms of decreased potential for health risks, decreased human safety hazards, reduced property damage, reduced agricultural damage, and reduced natural resource damage. In terms of the

effectiveness of a specific method or group of methods, this would not only be based on the specific method used, but more importantly upon the skills and abilities of the person implementing the control methods and the ability of that person to determine the appropriate course of action to take. It would be expected that the more experience a person has in addressing mammal damage conflicts and implementing control methods the more likely they would be in successfully reducing damage to acceptable levels. The WS technical assistance program provides information to assist persons in implementing their own MDM program, but at times the person receiving WS technical assistance may not have the skill or ability to implement the MDM methods recommended by WS. Therefore, it is more likely that a specific MDM method or group of methods would be effective in reducing damage to acceptable levels when WS professional wildlife damage assistance is provided than that would occur when the inexperienced person attempts to conduct MDM activities.

## **CHAPTER 3:        ALTERNATIVES**

### **3.0        INTRODUCTION**

The No Action alternative is a procedural NEPA requirement (40 CFR 1502), is a viable and reasonable alternative that could be selected, and serves as a baseline for comparison with the other alternatives. The No Action alternative, as defined here, is consistent with the Council on Environmental Quality's (CEQ's) definition (CEQ 1981).

Alternatives analyzed in detail are:

- Alternative 1: Technical Assistance Only.
- Alternative 2: Integrated Mammal Damage Management Program. (Proposed Action/No Action)
- Alternative 3: Non-lethal Mammal Damage Management Only By WS
- Alternative 4: No federal WS Mammal Damage Management.

### **3.1        DESCRIPTION OF THE ALTERNATIVES**

#### **3.1.1    Alternative 1: Technical Assistance Only**

This alternative would not allow for WS operational MDM in New Jersey. WS would only provide technical assistance and make recommendations when requested. Producers, property owners, agency personnel, corporations, or others could conduct MDM using any legal lethal or non-lethal method available to them.

#### **3.1.2    Alternative 2: Integrated Mammal Damage Management Program (Proposed Action/No Action)**

The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) proposes to continue the current damage management program that responds to mammal damage in the State of New Jersey. WS involvement in mammal damage management in New Jersey is closely coordinated with the New Jersey Division of Fish and Wildlife, and WS take of mammals is authorized through permits and/or other authorities. An Integrated Wildlife Damage Management (IWDM) approach would be implemented to reduce mammal damage to property, agricultural resources, and natural resources, and to reduce mammal impacts on human/public health and safety. Damage management would be conducted on public and private property in New Jersey when the resource owner (property owner) or manager requests assistance. An IWDM strategy would be recommended and used, encompassing the use of practical and effective methods of preventing or reducing damage while minimizing harmful effects of damage management measures on humans, target and non-target species, and the environment. Under this action, WS could provide technical assistance and direct operational damage management, including non-lethal and lethal management methods by applying the WS Decision Model (Slate et al. 1992). When appropriate, physical exclusion, habitat modification or harassment would be recommended and utilized to reduce damage. In other situations, mammals would be removed as humanely as possible using shooting, trapping, and registered pesticides and other products. In determining the damage management strategy, preference would be given to practical and effective non-lethal methods. However, non-lethal methods may not always be applied as a first response to each damage problem. The most appropriate response could often be a combination of non-lethal and lethal methods, or could include instances where application of lethal methods alone would be the most appropriate strategy.



### **3.1.3 Alternative 3: Non-lethal Mammal Damage Management Only by WS**

This alternative would require WS to use non-lethal methods only to resolve mammal damage problems. Information on lethal MDM methods would still be available to producers and property owners through other sources such as NJDFW, USDA Agricultural Extension Service offices, universities, or pest control organizations. Requests for information regarding lethal management approaches would be referred to NJDFW, FWS, local animal control agencies, or private businesses or organizations. Individuals might choose to implement WS non-lethal recommendations, implement lethal methods or other methods not recommended by WS, contract for WS direct control services, use contractual services of private businesses, or take no action. Persons receiving WS's non-lethal technical and direct control assistance could still resort to lethal methods that were available to them.

### **3.1.4 Alternative 4: No Federal WS Mammal Damage Management**

This alternative would eliminate WS involvement in MDM in New Jersey. WS would not provide direct operational or technical assistance and requesters of WS's assistance would have to conduct their own MDM without WS input. Information on MDM methods would still be available to producers and property owners through other sources such as NJDFW, USDA Agricultural Extension Service offices, universities, or pest control organizations. Requests for information would be referred to NJDFW, FWS, local animal control agencies, or private businesses or organizations. Individuals might choose to conduct MDM themselves, use contractual services of private businesses, or take no action.

## **3.2 MDM STRATEGIES AND METHODOLOGIES AVAILABLE TO WS IN NEW JERSEY**

The strategies and methodologies described below include those that could be used or recommended under Alternatives 1, 2 and 3 described above. Alternative 4 would terminate both WS technical assistance and operational MDM by WS. Appendix B is a more thorough description of the methods that could be used or recommended by WS.

### **3.2.1 Integrated Wildlife Damage Management (IWDM)**

The most effective approach to resolving wildlife damage is to integrate the use of several methods simultaneously or sequentially. The philosophy behind IWDM is to implement the best combination of effective management methods in the most cost-effective<sup>2</sup> manner while minimizing the potentially harmful effects on humans, target and non-target species, and the environment. IWDM may incorporate cultural practices (e.g., animal husbandry), habitat modification (e.g., exclusion), animal behavior modification (e.g., scaring), removal of individual offending animals, local population reduction, or any combination of these, depending on the circumstances of the specific damage problem.

### **3.2.2 The IWDM Strategies Employed by WS**

#### **Technical Assistance Recommendations**

"Technical assistance" as used herein is information, demonstrations, and advice on available and appropriate wildlife damage management methods and approaches. The implementation of damage management actions is the responsibility of the requester. In some cases, WS provides supplies or materials that are of limited availability for use by non-WS entities. Technical assistance may be provided through a personal or telephone consultation, or during an on-site visit with the requester. Generally, several management strategies are described to the requester for short and long-term solutions to damage problems; these strategies are based on the level of risk, need, and the practicality of their application. In some instances, wildlife-related information provided to the requestor by WS results in tolerance/acceptance of the situation. In other instances, management options are discussed and recommended.

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<sup>2</sup> The cost of management may sometimes be secondary because of overriding environmental, legal, human health and safety, animal welfare, or other concerns.

Under APHIS NEPA implementing regulations and specific guidance for the WS program, WS technical assistance is categorically excluded from the need to prepare an EA or EIS. However, it is discussed in this EA because it is an important component of the IWDM approach to resolving mammal damage problems.

#### **Direct Damage Management Assistance (Direct Control)**

Direct damage management assistance includes damage management activities that are directly conducted or supervised by WS personnel. Direct damage management assistance may be initiated when the problem cannot effectively be resolved through technical assistance alone and when *Agreements for Control* or other comparable instruments are provided for direct damage management by WS. The initial investigation defines the nature, history, and extent of the problem; species responsible for the damage; and methods available to resolve the problem. The professional skills of WS personnel are often required to effectively resolve problems, especially if restricted use pesticides are necessary or if the problems are complex.

#### **Educational Efforts**

Education is an important element of WS program activities because wildlife damage management is about finding balance and coexistence between the needs of people and needs of wildlife. This is extremely challenging as nature has no balance, but rather, is in continual flux. In addition to the routine dissemination of recommendations and information to individuals or organizations sustaining damage, lectures, courses, and demonstrations are provided to producers, homeowners, state and county agents, colleges and universities, and other interested groups. WS frequently cooperates with other agencies in education and public information efforts. Additionally, technical papers are presented at professional meetings and conferences so that WS personnel, other wildlife professionals, and the public are periodically updated on recent developments in damage management technology, programs, laws and regulations, and agency policies.

#### **Research and Development**

The National Wildlife Research Center (NWRC) functions as the research arm of WS by providing scientific information and development of methods for wildlife damage management that are effective and environmentally responsible. NWRC scientists work closely with wildlife managers, researchers, field specialists and others to develop and evaluate wildlife damage management techniques. NWRC scientists have authored hundreds of scientific publications and reports, and are respected world-wide for their expertise in wildlife damage management.

##### **3.2.2.1 Examples of WS Direct Operational and Technical Assistance in MDM in New Jersey**

- The Federal Aviation Administration (FAA) and the South Jersey Transportation Administration (SJTA) entered into Interagency Agreements and Cooperative Service Agreements with NJ WS for the purpose of assessing, managing, and monitoring wildlife-related public safety and aviation hazards at the Atlantic City International Airport (ACY). Mammal-aircraft strikes and hazards involving white-tailed deer, red fox, coyotes, and other mammals have created safety hazards at the airport. Since 1989, WS implemented an IWDM approach, consisting of technical assistance and direct control components: WS review of airport development and landscaping plans, habitat management recommendations, provision of training to ACY personnel, threatened and endangered species monitoring, hazardous mammal species population management, and exclusion. WS involvement at ACY has considerably reduced or prevented strikes with hazardous mammal species at the airport.
- During 1996-2003, the USFWS contracted with NJ WS for management of mammal predation to benefit piping plovers, least terns, and black skimmers at Cape May National Wildlife Refuge and at Forsythe NWR. WS conducted population management activities directed at red fox, opossums, raccoons, skunks, and other mammals, in order to increase plover productivity and assist the USFWS in implementing the Endangered Species Act. Piping Plover productivity (number of fledged chicks per nesting pair) on the Holgate Unit of Forsythe NWR increased from an average of 0.45 (for the three nesting seasons prior to WS involvement, 1993-95) to an average

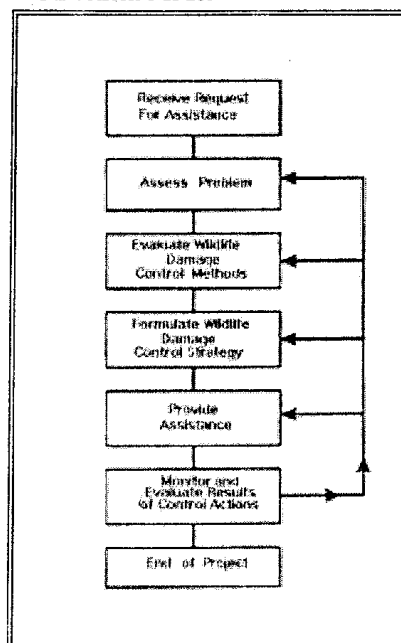
of 1.13 during WS program involvement (1996-2003). Similarly, on the Little Beach Unit of Forsythe NWR, plover productivity increased from 0.31 to 1.03 during WS program involvement. WS-implemented predation management contributes importantly to integrated wildlife management programs for the continued success of threatened and endangered beach-nesting bird species in these areas of New Jersey. WS predation management activities were one component of integrated management programs conducted by the landowning agency that also included nest exclosures, control of human access and impacts, and/or other components.

- The US Coast Guard entered into Cooperative Service Agreements with WS during 2001-2003, for the purpose of reducing impacts of mammal predation on piping plovers. WS conducted population reduction activities directed at opossums, raccoons, rats, skunks, and others, in order to increase plover productivity and assist the U.S. Coast Guard in implementing the Endangered Species Act. WS predation management activities were one component of integrated management programs conducted by the landowning agency that also included nest exclosures, control of human access and impacts, and/or other components.
- The Hunterdon County Board of Agriculture and the New Jersey Department of Agriculture entered into agreements with WS NJ to implement a Community-Based Deer Management Plan in Delaware Township (Hunterdon County) during 2001. Pursuant to an Agricultural Community Based Deer Management Permit issued by the NJDFW, WS biologists conducted deer management activities on five properties during February-March, 2001, using suppressed rifles, lights, elevated platforms, and other tools to contribute towards deer population management objectives of the NJDFW. The program satisfied all requirements of the CMDMP, including documentation and reporting, public notification, demonstration of shooting proficiency, authorization for suppressors from the County Prosecutor, etc. Additionally, local requirements from Delaware Township, including establishment of shooting safety zones, and coordination with the local Police Department were satisfied. All deer taken by WS during the program were butchered and processed for charitable donation, no safety problems occurred, and WS program involvement contributed positively to deer population management objectives for the deer management zone (DMZ).

### **3.2.3 WS Decision Making**

WS personnel use a thought process for evaluating and responding to damage complaints which is depicted by the WS Decision Model and described by Slate et al. (1992) (Figure 3-1). WS personnel are frequently contacted after requesters have tried or considered non-lethal methods and found them to be impractical, too costly, or inadequate to reduce damage. WS personnel assess the problem then evaluate the appropriateness and availability (legal and administrative) of strategies and methods based on biological, economic and social considerations. Following this evaluation, methods deemed to be practical for the situation are incorporated into a management strategy. After this strategy has been implemented, monitoring is conducted and evaluation continues to assess the effectiveness of the strategy. If the strategy is effective, the need for further management is ended. In terms of the WS Decision Model (Slate et al. 1992), most damage management efforts consist of continuous feedback between receiving the request and monitoring the results of the damage management strategy. The Decision Model is not a written documented process, but a mental problem-solving process common to most, if not all, professions.

**Figure 3-1**  
WS Decision Model



### 3.2.4 Mammal Damage Management Methods Available for Use (See Appendix B for a more detailed description of each method or approach.)

#### 3.2.4.1 Non-chemical Methods

**Exclusion** prevents wildlife access to protected resources through fencing, netting, or other physical barriers.

**Cultural methods<sup>3</sup> and habitat modifications** are typically implemented by agricultural producers or property owners. They consist primarily of non-lethal preventive methods which minimize exposure of the protected resource to wildlife that would cause damage or pose a threat.

**Habitat/environmental modification** to repel certain mammal species. This category includes removal of beaver dams, installation of water control devices, planting of lure crops, provision of alternate foods, and other methods. Lure crops/alternate foods are crops planted or other food resources provided to mitigate the potential loss of higher value crops.

**Animal behavior modification** refers to tactics that alter the behavior of mammals to reduce damage. Some but not all of these tactics include the following:

- Propane exploders
- Pyrotechnics
- Distress calls and sound producing devices
- Visual repellents and other scaring tactics

**Live capture and relocation of mammals** is through use of cage traps designed to capture mammals alive. Captured target mammals can then be relocated to other field locations or to animal shelters, pursuant to State laws and regulations.

<sup>3</sup> Generally involves modifications to the management of protected resources to reduce their vulnerability to wildlife damage.

**Traps**, including body-gripping traps (Conibear), snap traps, snares, Hancock/Bailey Traps, and box/cage traps are used to capture or kill mammals in damage situations.

**Shooting** is helpful in some situations to supplement and reinforce other dispersal techniques and to kill mammals that are legally trapped. It is selective for target species and may be used in conjunction with the use of spotlights, calling, and other alternative legal tools (elevated positions, stands, etc.). Shooting with firearms is sometimes used to manage mammal damage problems when lethal methods are determined to be appropriate. The animals are killed as quickly and humanely as possible.

**Sport harvest through hunting and trapping** is often an important part of MDM strategies, and is recommended by WS to enhance the effectiveness of other damage management techniques and to accomplish population management objectives developed by the NJDFW.

#### **4.2.4.2 Chemical Methods**

**Repellents** are usually naturally occurring substances that are chemically formulated to be distasteful or to elicit pain or discomfort to target animals when they are encountered. In NJ, wildlife repellents are registered with the NJDEP PCP.

**Toxicants** such as gas cartridges, large gas cartridges, and Zinc Phosphide Concentrate for Rodent and Lagomorph Control (registered with the NJDEP PCP by WS), and other toxicants (registered by other entities) may be used and recommended to lethally control mice, woodchucks, and other mammals associated with damage. Label directions are followed, and application by WS occurs at specific sites, pursuant to landowner requests and all pertinent laws, regulations, and policies.

**Carbon dioxide (CO<sub>2</sub>) gas** is an AVMA-approved euthanasia method (AVMA 2001) which is sometimes used to euthanize mammals that have been chemically immobilized or captured in live traps. Live animals are placed in an enclosed space into which CO<sub>2</sub> gas is released. The animals quickly expire after inhaling the CO<sub>2</sub>.

**Drugs** such as anesthetics (Ketamine, Telazol), sedatives (analgesics) (Xylazine), euthanasia agents (Sodium Pentobarbital and its derivatives, Potassium Chloride) and accessory drugs (Yohimbine, antibiotics, etc.) are used to capture, sedate, handle, and/or euthanize animals involved in wildlife damage or disease situations. These and other drugs are available for WS use, pursuant to State and Federal regulations, and are identified as approved drugs by the WS program through its Immobilization and Euthanasia Committee.

### **3.3 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL WITH RATIONALE**

Several alternatives were considered, but not analyzed in detail. These were:

#### **3.3.1 Lethal Mammal Damage Management Only By WS**

Under this alternative, WS would not conduct any non-lethal control of mammals for MDM purposes in the State, but would only conduct lethal MDM. This alternative was eliminated from further analysis because some mammal damage problems can be resolved effectively through non-lethal means. Additionally, lethal methods may not always be available for use due to safety concerns or local ordinances prohibiting the use of some lethal methods, such as the discharge of firearms.

### 3.3.2 Compensation for Mammal Damage Losses

The compensation alternative would require the establishment of a system to reimburse persons impacted by mammal damage. This alternative was eliminated from further analysis because no federal or state laws currently exist to authorize such action. Under such an alternative, WS would not provide any direct control or technical assistance. Aside from lack of legal authority, analysis of this alternative in the ADC Final EIS indicated that the concept has many drawbacks (USDA 1997):

- It would require larger expenditures of money and labor to investigate and validate all damage claims to determine and administer appropriate compensation.
- Compensation would most likely be less than full market value. Responding in a timely fashion to all requests to assess and confirm damage would be difficult and certain types of damage could not be conclusively verified. For example, proving conclusively in individual situations that mammals were responsible for disease outbreaks would be impossible, even though they may actually have been responsible. Thus, a compensation program that requires verification would not meet its objective for mitigating such losses.
- Compensation would give little incentive to resource owners to limit damage through improved cultural, husbandry, or other practices and management strategies.
- Not all resource owners would rely completely on a compensation program and unregulated lethal control would most likely continue as permitted by state law.
- Compensation would not be practical for reducing threats to human health and safety.

### 3.3.3 Reproduction Control

Reproductive control is often considered for use where wildlife populations are overabundant and where traditional hunting or lethal control programs are not publicly acceptable (Muller et al. 1997). Use and effectiveness of reproductive control as a wildlife population management tool is limited by population dynamic characteristics (longevity, age at onset of reproduction, population size and biological/cultural carrying capacity, etc.), habitat and environmental factors (isolation of target population, cover types and access to target individuals, etc.), socioeconomic and other factors. Population modeling indicates that reproductive control is more efficient than lethal control only for some rodent and small bird species with high reproductive rates and low survival rates (Dolbeer 1998). Additionally, the need to treat a sufficiently large number of target animals, multiple treatments, and population dynamics of free-ranging populations place considerable logistic and economic constraints on the adoption of reproduction control technologies as a wildlife management tool for some species. Research into reproductive control technologies, however, has been ongoing, and the approach will probably be considered in an increasing variety of wildlife management situations.

Reproductive control for wildlife could be accomplished either through sterilization (permanent) or contraception (reversible).

Sterilization could be accomplished through:

- Surgical sterilization (vasectomy, castration, and tubal ligation),
- Chemosterilization
- Gene therapy.

Contraception could be accomplished through:

- Hormone implantation (synthetic steroids such as progestins)
- Immunocontraception (contraceptive vaccines)
- Oral contraception (progestin administered daily).

Research into the use of these techniques would consist of laboratory/pen experimentation to determine and develop the sterilization or contraceptive material or procedure, field trials to develop the delivery system, and field experimentation to determine the effectiveness of the technique in achieving population reduction.

The use of hormones was investigated (Matschke 1976, 1977 a, b, c, Roughton 1979), and eventually rejected as an effective and efficient reproductive control technique for deer. Additionally, concerns related to costs and logistics of widespread distribution of drugged baits, dosage control and ingestion of baits by children and nontarget animals make oral contraception (by steroids) largely impractical (Lowery et al. 1993). More recently, immunocontraception has been studied in various situations and locations, but its potential use appears limited due to considerable constraints regarding treatment and follow-up treatment of a sufficiently large number of target animals, varying immunogenicity of vaccines, genetic backgrounds of individual animals, age, nutritional status, stress and other factors (Becker and Katz 1997, Becker et al. 1999). Immunocontraceptive vaccines prevent conception by stimulating the production of antibodies that bionutralize proteins or hormones essential for reproduction (Miller et al. 2000). The use of porcine zona pellucida (PZP) as a contraceptive agent in wildlife management has been investigated recently (Kirkpatrick et al. 1990, Turner and Kirkpatrick 1991, Turner et al. 1992 and 1996), but to date, there is no published documentation that immunocontraceptive vaccines have successfully reduced any free-ranging deer herd or population. Additionally, Underwood and Verret (1998) reported that despite 5 years of PZP treatment, the Fire Island, NY white-tailed deer population continued to grow, albeit at a slower rate. Other components of the reproductive system have been studied for immunocontraception as well, such as GnRH (Becker and Katz 1997, Becker et al. 1999).

Recently, Canadian researchers at Dalhousie University (Halifax, Nova Scotia) have investigated the use of a single-dose immunocontraceptive vaccine based on liposome delivery of PZP antigens (Spay Vac<sup>TM</sup>), and reported a 90% reduction in pup production by gray seals (*Halichoerus grypus*) (Brown et al. 1997). Fraker et al. (in press) reported that fertility of an island population of fallow deer (*Dama dama*) was greatly reduced by a single administration of Spay Vac<sup>TM</sup> during the first year of treatment; a longer-term assessment is underway. Refinement of the delivery system and field application/experimentation on the ability of Spay Vac<sup>TM</sup> to reduce free-ranging cervid populations will occur in subsequent years.

Turner et al. (1993) note that although contraception in white-tailed deer may be used to limit population growth, it will not reduce the number of animals in excess of the desired level in many circumstances. They further contend that initial population reductions by various other means may be necessary to achieve management goals, and that reproduction control would be one facet of an integrated program. In sum, although immunocontraceptive technology has been variously effective in laboratories, pens, and in island field applications, it has not been effective in reducing populations of free-ranging white-tailed deer.

Development of a single-shot sterilization technique as an alternative to immunocontraception was investigated by Rutgers University scientists in 2000. One possible approach is gene therapy which could accomplish reproductive control via sterilization through producing death of the anterior pituitary cells that synthesize luteinizing hormone (LH), which triggers ovulation in females and spermatogenesis in males. Efficacy testing and development of a delivery system will be investigated over the next few years.

The use of reproductive control is subject to Federal and State regulation. Additionally:

- No chemical or biological agent to accomplish reproductive control for free-ranging mammals has been approved for operational use by Federal and New Jersey authorities. The NJDFW has approved the use of SpayVac on an experimental basis as part of a research project being conducted by a private company in a NJ municipality,

- For cervids, reproductive control has not been shown to reduce free-ranging populations or damage,
- If an effective tool was legally available, and if the project area was fenced, it would take many years for some mammal populations to stabilize at a lower level, and ongoing damage would continue to occur at unacceptably high levels, and
- There are considerable logistic, economic and socio-cultural limitations to trapping, capturing and chemical treatment of the hundreds or thousands of mammals that would be necessary to affect an eventual decline in the population. Because there is no tool currently available for field application, and due to considerable logistic, economic, and socio-cultural limitations to the use of fertility control on free-ranging mammals, this approach is not considered for further analysis in this EA.

### **3.4 MITIGATION AND STANDARD OPERATING PROCEDURES FOR MAMMAL DAMAGE MANAGEMENT TECHNIQUES**

#### **3.4.1 Mitigation in Standard Operating Procedures (SOPs)**

Mitigation measures are any features of an action that serve to prevent, reduce, or compensate for effects that otherwise might result from that action. The current WS program, nationwide and in New Jersey, uses such mitigation measures and these are discussed in detail in Chapter 5 of the ADC Final EIS (USDA 1997). Some key mitigating measures pertinent to the proposed action and alternatives of this EA that are also incorporated into WS SOPs include:

- The WS Decision Model thought process which is used to identify effective wildlife damage management strategies and their effects.
- Reasonable and prudent measures or alternatives are identified through consultation with the USFWS and are implemented to avoid effects to T&E species.
- EPA-approved label directions are followed for all pesticide use. The registration process for chemical pesticides is intended to assure minimal adverse effects to the environment when chemicals are used in accordance with label directions.
- All WS biological personnel in New Jersey using restricted chemicals and controlled substances (immobilization and euthanizing drugs) are trained and certified by, or operate under the direct supervision of, program personnel or others who are trained in the safe and effective use of chemical MDM materials. Management controls are in place within WS and its I&E Committee to maintain personnel training and certification.
- Research is being conducted to improve MDM methods and strategies so as to increase selectivity for target species, to develop effective non-lethal control methods, and to evaluate non-target hazards and environmental effects.

#### **3.4.2 Additional Mitigation Specific to the Issues**

The following is a summary of additional mitigation measures that are specific to the issues listed in Chapter 2 of this document.

- Management actions would be directed toward localized populations or groups of target species and/or individual offending members of those species. Generalized population suppression across the State, or even across major portions of the State, would not be conducted.



- WS uses MDM devices and conducts activities for which the risk of hazards to public safety and hazard to the environment have been determined to be low according to a formal risk assessment (USDA 1997, Appendix P). Where such activities are conducted on private lands or other lands of restricted public access, the risk of hazards to the public is even further reduced.
- WS personnel are trained and experienced to select the most appropriate method for taking problem animals and excluding non-target take.
- WS has consulted with the USFWS regarding potential effects of control methods on T&E species and abides by reasonable and prudent alternatives (RPAs) and/or reasonable and prudent measures (RPMs) established as a result of that consultation. For the full context of the Biological Opinion, see the ADC Final EIS, Appendix F (USDA 1997).
- WS has consulted with the NJDFW Endangered and Nongame Species Program regarding potential effects of mammal damage management control methods on State-listed T&E species.
- WS uses chemical methods for MDM that have undergone rigorous research to prove their safety and lack of serious effects on non-target animals and the environment.

## CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

### 4.0 INTRODUCTION

Chapter 4 provides information needed for making informed decisions in selecting the appropriate alternative for meeting the purpose of the proposed action. This chapter analyzes the environmental consequences of each alternative in relation to the issues identified for detailed analysis in Chapter 2. This section analyzes the environmental consequences of each alternative in comparison with the no action alternative to determine if the real or potential effects would be greater, lesser, or the same.

The following resource values within the State are not expected to be significantly impacted by any of the alternatives analyzed: soils, geology, minerals, water quality/quantity, flood plains, wetlands, visual resources, air quality, prime and unique farmlands, aquatic resources, timber, and range. These resources will not be analyzed further.

**Cumulative Effects:** Cumulative effects are discussed in relationship to each of the alternatives analyzed, with emphasis on potential cumulative effects from methods employed, and including summary analyses of potential cumulative impacts to target and non-target species, including T&E species.

**Irreversible and Irretrievable Commitments of Resources:** Other than minor uses of fuels for motor vehicles and other materials, there are no irreversible or irretrievable commitments of resources.

**Effects on sites or resources protected under the National Historic Preservation Act:** WS MDM actions are not undertakings that could adversely affect historic resources (See Section 1.1.8).

### 4.1 ENVIRONMENTAL CONSEQUENCES FOR ISSUES ANALYZED IN DETAIL

#### 4.1.1 Effects on Target Mammal Species Populations

##### 4.1.1.1 Alternative 1: Technical Assistance Only

Under this alternative, WS would have no impact on target mammal populations in the State because the program would not provide any operational MDM activities. The program would be limited to providing advice only. Private efforts to reduce or prevent mammal damage and perceived disease transmission risks could increase, which could result in similar or even greater effects on those populations than the Proposed Action. However, for the same reasons shown below in the population effects analysis in section 4.1.1.2, it is unlikely that target mammal populations would be adversely impacted by implementation of this alternative. It is hypothetically possible that frustration caused by the inability to reduce damage and associated losses could lead to illegal use of other chemicals which could lead to real but unknown effects on target mammal populations.

##### 4.1.1.2 Alternative 2: Integrated Mammal Damage Management Program (Proposed Action/No Action)

Analysis of this issue is limited to those species killed during WS MDM. The analysis for magnitude of impact generally follows the process described in Chapter 4 of USDA (1997). Magnitude is described in USDA (1997) as "... a measure of the number of animals killed in relation to their abundance." Magnitude may be determined either quantitatively or qualitatively. Quantitative determinations are based on population estimates, allowable harvest levels, and actual harvest data. Qualitative determinations are based on population trends and harvest data when available. Generally, WS only conducts damage management on species whose population densities are high and usually only after they have caused damage. Tables 4-1 and 4-2 identify the number of mammal wildlife species taken and the number of mammals harassed by WS during FY2000-FY2002.

Table 4-1. Wild mammals lethally removed by WS for Mammal Damage Management during FY 2001 through FY 2003 in New Jersey.

Species	Cage Trap	Snare	Shooting	Non-Chemical /Other*	Total
White-tailed Deer	0	0	28	0	28
Red Fox	0	4	5	0	9
Virginia Opossum	41	0	1	0	42
Raccoon	53	0	0	0	53
Striped Skunk	1	0	1	0	2
White-footed Mouse	0	0	0	3	3
Meadow Jumping Mouse	0	0	0	1	1
Short-tailed Shrew	0	0	0	2	2
Meadow Vole	0	0	0	53	53
Total	95	4	35	59	193

\* This category includes snap traps.

Table 4-2. Number of wild mammals harassed by WS for Mammal Damage Management activities during FY 2001 through FY 2003 in New Jersey.

Species	FY 2001	FY 2002	FY 2003	2001-03
Coyote	1	1	0	2
Red Fox	0	1	4	5

### White-Tailed Deer

In New Jersey, white-tailed deer are permanent residents, and occupy almost all undeveloped land within the State as well as almost all other areas (industrial, commercial, residential) that provide food, cover, and fresh water (NJDFW 1999). Viable deer populations inhabit 20 of New Jersey's 21 counties (Hudson County being the exception). Deer populations may be estimated using gender and age ratios of deer harvested during the hunting seasons. Forward Looking Infrared (FLIR) surveys may be used to estimate localized deer populations. Recent estimates of the statewide deer population developed by the NJDFW indicate that there are approximately 150,000-170,000 white-tailed deer in the state. Statewide reproductive rates (fawns produced per fawn, yearling, and adult doe) in NJ (2000) were estimated to be 0.35 for fawn does, 1.53 for yearling does, and 1.83 for adult does (Ferrigno et al. 2002). Capture and marking studies of deer in Hunterdon County conducted between 1970 and 1976 indicated that the main home range size of NJ deer is one square mile or less (Burke et al. 1990). Field-dressed deer in NJ averaged 84.6 pounds (females) to 96.8 pounds (males) during the 2000-01 deer season (Ferrigno et al. 2002).

White-tailed deer are managed by the NJ Division of Fish and Wildlife under Title 23 and other State of NJ laws and regulations. The NJDFW, as the agency with management responsibility, could impose restrictions on depredation harvest as needed to assure cumulative take does not adversely affect the continued viability of the NJ deer population. This should assure that cumulative impacts on the deer population would have no significant adverse impact on the quality of the human environment. Each year the NJDFW develops deer population management strategies based on deer-vehicle collisions, deer damage, public tolerance and appreciation of deer, and other factors. For 2003-04, strategies are either to stabilize the deer population (in 26 deer management zones) or decrease the population (in 35 deer management zones).

In 1999, the NJDFW prepared, in consultation with the NJDA, a document entitled, "Governor's Report on Deer Management in New Jersey". The report included a description of the state's deer population and management programs, identification of urban/suburban and agricultural problem

areas, a description of factors contributing to deer overabundance, recommendations to reduce deer-human conflicts (especially agricultural damage), and other information. In addition to a recommendation for NJ State Legislative support for deer damage management bills, the following recommendations pertaining to deer damage management were identified for implementation by the NJDFW: 1. Continue modification of deer hunting regulations to optimize deer harvest in damage areas, 2. Develop deer management plans, 3. Conduct annual assessments of deer in NJ, 4. Increase farmer and sportsman involvement in deer management strategies and hunting regulations, 5. Continue development of the Community Based Deer Management Program, 6. Increase the Special Area Deer Management Program, 7. Promote quality deer management programs, 8. Increase deer research, Wildlife Control Unit funding, and public education, and 9. Monitor other states' handling of deer damage management experiences.

Regulated take of white-tailed deer in New Jersey occurs in the following ways: 1. harvest during deer hunting seasons, 2. take pursuant to the Community Based Deer Management Program, 3. take pursuant to Special Wildlife Management Permits, and 4. take pursuant to Permits to Kill Wild Deer.

1. White-tailed Deer Hunting Seasons Each year, approximately 95,000 New Jersey deer hunters spend 1.5 million recreation days in the field participating in deer hunting seasons, and an estimated 2.7 million pounds of venison are provided from the annual harvest (NJDFW 1999). Deer populations are controlled primarily through harvest of antlerless deer (adult does and fawns), which may be harvested in NJ during all but one of NJ deer hunting seasons (not during Six-Day Firearm Seasons). Antlerless deer constitute 70 percent of the state's total deer harvest. During 2002-03, a total of 63,786 deer were harvested in NJ, during six deer hunting seasons: Fall Bow (11,305 deer harvested), Permit Bow (9,051), Six-Day Firearm (10,588), Permit Muzzleloader (10,231), Permit Shotgun (20,912), and Winter Bow (894). An additional 805 deer were harvested during the Youth Day hunt. During 2003, NJ counties with the greatest average annual number of deer harvested were Hunterdon (11,893 deer harvested), Sussex (6,625), Warren (6,380), and Burlington (6,013).

2. Community Based Deer Management Program The Community Based Deer Management Program (CBDMP) is designed to assist local authorities in dealing with deer populations that have exceeded the cultural and/or physical capacity to sustain them. The NJDFW cooperates with municipal, state and Federal agencies to develop and implement alternative management strategies for use in environments where traditional or controlled hunting programs have not achieved desired population reduction goals. Examples of alternative strategies employed through the CBDMP include use of suppressed rifles, lights, elevated stands, vehicles, shooting at night, as well as live capture and euthanize/relocate and use of reproductive control technologies. Program "Cooperators" (municipalities, airports, and County Boards of Agriculture) may apply to the NJDFW for designation as a Special Deer Management Area, and then complete an Application for a Community Based Deer Management Plan. The Plan must include an estimate of the deer population, the proposed population or density, a description of the proposed methods and timing, intent to provide written notice to adjacent landowners, a notarized letter stating the shooting qualifications of agents, intended safety precautions, written landowner permission to access private lands, a local resolution supporting the program, County Prosecutor approval for use of suppressed rifles, and other elements. Once the Plan is approved by the State Fish and Game Council, the NJDFW issues the Community-Based Deer Management Permit that identifies the authorized methods, agents (the individual, agency, or company that implements the Plan), and other requirements and procedures to be followed. The Cooperator must file a report with the NJDFW, which identifies costs, program effectiveness, and other information.

During the 2003 State Fiscal year (July 1, 2002-June 30, 2003), the NJDFW issued Community Based Deer Management Program Permits to six NJ municipalities. A total of 746 deer were taken by alternative methods by agents authorized on these permits. Agents involved in the programs were sportsmen, hunting clubs, and private wildlife damage management companies.

3. Special Wildlife Management Permit Program The NJDFW is authorized to issue Special Wildlife Management Permits as necessary to achieve program goals and address issues of concern to the public. During 2002, the NJDFW issued Special Wildlife Management Permits to 8 NJ airports for deer removal to protect public safety, and one Special Wildlife Management Permit to a college for trap and transfer of deer. A total of 60 deer were taken at the 8 NJ airports, and one deer was transferred away from the college.

4. Agricultural Permits to Kill Depredating Deer The NJDFW Wildlife Control Unit manages a deer damage management program for NJ agriculturalists experiencing deer-related problems. An integrated management program is recommended and implemented, including habitat management, harassment of deer, sport hunting, population reduction, repellents, fencing, and other approaches. During 2003, in addition to distributing technical recommendations and repellents, the WCU also issued 407 Permits to Kill Wild Deer to NJ entities, resulting in the take of 2117 deer as part of integrated deer damage management activities (T. McBride pers. Comm.. 2004).

In sum, take of deer in NJ during 2002-2003 totaled 66,709 animals: 63,786 during hunting seasons, 746 pursuant to the Community Based Deer Management Program, 60 under Special Wildlife Management Permits, and 2,117 under Permits to Kill Wild Deer. Based upon an anticipated increase in requests for services, WS's lethal management of white-tailed deer in New Jersey would be expected to be no more than approximately 800 animals in any one year under the Proposed Action.

Based on the above information, NJDFW oversight, and WS limited lethal take of deer in New Jersey, WS should have minimal effects on local or statewide white-tailed deer populations. WS take of deer pursuant to CBDMP permits, Special Wildlife Management Permit, Agricultural Permits to Kill Depredating Deer and/or other authorities, would contribute positively to the NJDFW's deer population management goals relating to deer population reduction and control of deer-related damage.

### Raccoon

In NJ, raccoons are managed by the NJDFW as a furbearer and a small game species. Raccoons may be trapped statewide during mid-November through mid-March, with no daily limit (NJAC 7:25-5.11). Additionally, they may be hunted during October-February, with no daily limit (NJAC 7:25-5.17). In damage situations, property owners, dwelling occupants, farmers, and their agents, may take raccoons (no State permit required) via lawful procedures to alleviate damage to property, agricultural resources (including livestock, crops, or poultry), and other resources (NJAC 7:25-5.21). Raccoons taken pursuant to NJAC 7:25-5.21 are usually shot or trapped, and NJ hunting/trapping licenses are not required to take raccoons pursuant to NJAC 7:25-5.21. In some situations, raccoons are relocated pursuant to the NJDFW's Policy on Relocation of Wildlife. The Policy states that if relocation of the mammal involved in a nuisance or damage problem will likely transfer the problem to the release site, then euthanasia should be considered, and conducted according to the methods found acceptable in the most recent Report of the American Veterinary Medical Association's Panel on Euthanasia (AVMA 2001). For raccoons, the Policy on Relocation of Wildlife requires that adult raccoons be relocated at the capture site, or within the township of origin (and within 10 miles of the capture site) in suitable habitat, with landowner permission. The NJDFW considers raccoons to be a vector species for the raccoon rabies strain that is currently endemic in New Jersey.

Absolute raccoon population densities are difficult or impossible to determine because of the difficulty in knowing what percentage of the population has been counted or estimated and the additional difficulty of knowing how large an area the raccoons are using (Sanderson 1987). Due to their adaptability, raccoon densities are greater in urban areas than in rural areas. Relative

raccoon population densities have been variously inferred by take of animals per unit area. For instance, Twichell and Dill (1949) reported removing 100 raccoons from tree dens in a 41 ha (101 acres) waterfowl refuge area, while Yeager and Rennels (1943) studied raccoons on 881 ha (2,177 acres) in Illinois and reported trapping 35-40 raccoons in 1938-39, 170 in 1939-40, and 60 in 1940-41. Slate (1980) estimated 1 raccoon/7.8 ha (19.3 acres) in New Jersey in predominantly agricultural land on the inner coastal plain. Raccoon densities of 100 per sq. mile (1 raccoon per 6.4 acres) can be attained around abundant food sources (Kern 2002). Kennedy et al. (1991) estimated 13 raccoons per 100 ha (1 raccoon per 19 acres) of lowland forest in Tennessee.

No population estimates were available for raccoons in New Jersey. Therefore the best available information was used to estimate minimum statewide population size for raccoons. There are over 3 million acres of rural land in New Jersey, with approximately 600,000 acres considered cropland (U.S. Census Bureau 1999). Using the assumption that 75% of the rural lands throughout the state have sufficient habitat to support raccoons, raccoons are only found in rural habitat, raccoon densities average 1 raccoon per 19/acre, a conservative (minimum) statewide raccoon population could be estimated at over 118,000 raccoons.

The NJDFW Furbearer and Upland Game Project reported that 20,864 raccoons were harvested during State Fiscal Year 2002 (July 1, 2001-June 30, 2002) in New Jersey; 17,000 raccoons were taken by hunters and 3,864 were taken by trappers. The statewide raccoon population is increasing, but of unknown size (A. Burnett, pers. comm., November 2003). During 2003, the NJDFW handled 124 requests for assistance/information from the public regarding raccoons.

Based upon an anticipated increase in requests for services, WS's lethal management of raccoons in New Jersey would be expected to be no more than approximately 300 animals in any one year under the Proposed Action. Based on the above information, NJDFW oversight, and WS limited lethal take of raccoons in New Jersey, WS should have minimal effects on local or statewide raccoon populations.

### **Virginia Opossum**

In NJ, opossums are managed by the NJDFW as a furbearer and a small game species. Opossums may be trapped statewide during mid-November through mid-March, with no daily limit (NJAC 7:25-5.11). Additionally, they may be hunted during October-February, with no daily limit (NJAC 7:25-5.17). In damage situations, property owners, dwelling occupants, farmers, and their agents, may take opossum (no State permit required) via lawful procedures to alleviate damage to property, agricultural resources (including livestock, crops, or poultry), and other resources (NJAC 7:25-5.21). Opossum taken pursuant to NJAC 7:25-5.21 are usually shot or trapped, and NJ hunting/trapping licenses are not required to take opossums pursuant to NJAC 7:25-5.21. In some situations, they are relocated pursuant to the NJDFW's Policy on Relocation of Wildlife. The Policy states that if relocation of the mammal involved in a nuisance or damage problem will likely transfer the problem to the release site, then euthanasia should be considered, and conducted according to the methods found acceptable in the most recent Report of the American Veterinary Medical Association's (AVMA) Panel on Euthanasia. For opossums, the Policy on Relocation of Wildlife directs that opossums be relocated as close to the capture site as possible, with landowner permission, and in such a manner so as not to create local overabundance of the released species. Due to the rare occurrence of rabies in opossums, the NJDFW does not consider this species to be a rabies vector species.

Opossums use a home range consisting of 4-20 ha. (10-50 acres) in size (Jackson 1994, Seidensticker, et al. 1987). Opossums live for only 1-2 years, with as few as 8% of a population of these animals surviving into the second year in a study in Virginia, conducted by Seidensticker, et al. (1987). In this 5 year study, it was also observed that there was a wide variation in opossum numbers, in what was considered excellent habitat for the species. These variations were observed

seasonally and in different years. However, the mean density during the study was 3.9/km<sup>2</sup> (10.1/mi<sup>2</sup>). This was comparable to other opossum population densities in similar habitats in Virginia.

No population estimates were available for opossums in New Jersey. Therefore the best available information was used to estimate a minimum statewide population. There are over 3 million acres of rural land in New Jersey, with approximately 600,000 acres considered cropland (U.S. Census Bureau 1999). Using the assumption that 75% of the rural lands throughout the state have sufficient habitat to support opossums, opossums are only found in rural habitat, opossum densities average 1 per 63 acres, a conservative (minimum) statewide opossums population could be estimated at over 35,700 opossums.

The NJDFW's Furbearer and Upland Game Project reported that 1635 opossum were harvested during State Fiscal Year 2002 (July 1, 2001-June 30, 2002) in New Jersey; 1070 were taken by hunters and 565 were taken by trappers. The statewide opossum population is stable, but of unknown size (A. Burnett, pers. comm., November 2003). During 2003, the NJDFW handled 24 requests for assistance or information from the public regarding opossum.

Based upon an anticipated increase in requests for services, WS's lethal management of opossum in New Jersey would be expected to be no more than approximately 100 animals in any one year under the Proposed Action. Based on the above information, NJDFW oversight, and WS limited lethal take of opossum in New Jersey, WS should have minimal effects on local or statewide opossum populations.

### **Striped Skunk**

In NJ, striped skunks are managed by the NJDFW as a furbearer. Skunks may be trapped statewide during mid-November through mid-March, with no daily limit (NJAC 7:25-5.11). In damage situations, property owners, dwelling occupants, farmers, and their agents, may take skunks (no State permit required) via lawful procedures to alleviate damage to property, agricultural resources (including livestock, crops, or poultry), and other resources (NJAC 7:25-5.21). Skunks taken pursuant to NJAC 7:25-5.21 are usually trapped, and NJ hunting/trapping licenses are not required to take skunks pursuant to NJAC 7:25-5.21. In some situations, skunks are relocated pursuant to the NJDFW's Policy on Relocation of Wildlife. The Policy states that if relocation of the mammal involved in a nuisance or damage problem will likely transfer the problem to the release site, then euthanasia should be considered, and conducted according to the methods found acceptable in the most recent Report of the American Veterinary Medical Association's (AVMA) Panel on Euthanasia. For skunks, the Policy on Relocation of Wildlife requires that adult skunks be relocated at the capture site or within the township of origin (and within 10 miles of the capture site) in suitable habitat, with landowner permission. The NJDFW considers skunks to be a vector species for the raccoon rabies strain that is currently endemic in New Jersey.

The home range of striped skunks is usually not consistent. It appears to be in relation to life history requirements such as winter denning, feeding activities, dispersal and parturition (Rosatte 1987). Other literature reported the home ranges of striped skunks to average between 2.2 and 4.9 km<sup>2</sup> (0.85 -1.9 miles<sup>2</sup>) in rural areas of Minnesota and Illinois (Rosette, in Novak, et al. 1987). During the breeding season, males may travel larger areas in search of females. Skunk densities vary widely according to season, food sources and geographic area. Densities have been reported to range from 1 skunk per 77 acres to 1 per 10 acres (Rosatte 1987).

No population estimates were available for striped skunks in New Jersey. Therefore the best available information was used to estimate statewide populations. There are over 3 million acres of rural land in New Jersey, with approximately 600,000 acres considered cropland (U.S. Census Bureau 1999). Using the assumption that 50% of the rural lands throughout the state have sufficient habitat to support striped skunks, skunks are only found in rural habitat, and skunk

densities average 1 skunk per 77/acre, a conservative statewide stripped skunk population could be estimated at over 19,500 skunks.

The NJDFW's Furbearer and Upland Game Project reported that 135 skunks were trapped during State Fiscal Year 2003 (July 1, 2002-June 30, 2003) in New Jersey, and that the statewide population is stable (A. Burnett, pers. comm., November 2003, Federal Aid Report), but of unknown size. During 2003, the NJDFW handled 42 requests for assistance/information from the public regarding skunks.

Based upon an anticipated increase in requests for services, WS's lethal management of skunks in New Jersey would be expected to be no more than approximately 100 animals in any one year under the Proposed Action. Based on the above information, NJDFW oversight, and WS limited lethal take of skunks in New Jersey, WS should have minimal effects on local or statewide skunk populations.

### **Woodchuck**

In NJ, woodchucks are managed by the NJDFW as a small game species. Woodchucks may be hunted (with a bow, rifle, or shotgun) during March-September, with no daily limit (NJAC 7:25-5.18). In damage situations, property owners, dwelling occupants, farmers, and their agents, may take woodchucks (no State permit required) via lawful procedures to alleviate damage to property, agricultural resources (including livestock, crops, or poultry), and other resources (NJAC 7:25-5.21). Woodchucks taken pursuant to NJAC 7:25-5.21 are usually shot, trapped, or taken with gas cartridges, and NJ hunting/trapping licenses are not required to take woodchuck pursuant to NJAC 7:25-5.21. In a few situations, woodchucks are relocated pursuant to the NJDFW's Policy on Relocation of Wildlife. The Policy states that if relocation of the mammal involved in a nuisance or damage problem will likely transfer the problem to the release site, then euthanasia should be considered, and conducted according to the methods found acceptable in the most recent Report of the American Veterinary Medical Association's (AVMA) Panel on Euthanasia. For woodchucks, the Policy on Relocation of Wildlife requires that adult woodchucks be relocated at the capture site or within the township of origin (and within 10 miles of the capture site) in suitable habitat, with landowner permission. The NJDFW considers woodchucks to be a vector species for the raccoon rabies strain that is currently endemic in New Jersey.

Female woodchucks usually produce from 4 to 6 young (Chapman and Feldhamer, 1982). The offspring breed at age 1 and live 4-5 years. If a pair of woodchucks and their offspring all survived to breed as soon as possible, with an average litter size of 4 with a 1:1 sex ratio; they could produce over 645 woodchucks through their life time.

No population data or density information was available for woodchucks in New Jersey. The NJDFW's Furbearer and Upland Game Project reported that 63,607 woodchucks were taken by hunters during State Fiscal Year 2002 (July 1, 2001-June 30, 2002) in New Jersey, and that the statewide population is stable, but of unknown size (A. Burnett, pers. comm., November 2003, Federal Aid Report). During 2003, the NJDFW handled 164 requests for assistance/information from the public regarding woodchuck.

Based upon an anticipated increase in requests for services, WS's lethal management of woodchuck in New Jersey would be expected to be no more than approximately 300 animals in any one year under the Proposed Action. Based on the above information, NJDFW oversight, and WS limited lethal take of woodchuck in New Jersey, WS should have minimal effects on local or statewide woodchuck populations.



## Beaver

In NJ, beaver are managed by the NJDFW as a furbearer. Beaver may be trapped recreationally pursuant to a Special Permit issued by the NJDFW during January through early February, with a limit of 8 beavers taken per permit and a maximum of 5 traps in use (NJAC 7:25-5.9). Also within the trapping season, and in damage situations, beavers may be taken to alleviate damage pursuant to a Special Site Specific Beaver Permit issued to trappers by the NJDFW (NJAC 7:25-5.9d, a maximum of 20 permits, with a bag limit of 10 beavers each, can be issued annually). Damage complaints that occur outside of the recreational trapping season are handled by the NJDFW WCU. The response consists of a site visit, provision of recommendations, and removal of the beavers associated with the problem. Removal of the beavers by NJDFW WCU usually consists of lethal take (Conibear, snares, Hancock trap and euthanize), but in a few situations, beaver are relocated (live caught with Hancock trap) if a suitable release site exists. WCU personnel may physically remove beaver dams using traditional methods, and install flumes to alleviate damage. In a very few instances each year (typically less than 5), the NJDFW WCU issues Special Wildlife Management Permits (NJAC 7:25-5) for trappers to remove beavers associated with problems, when the NJDFW WCU cannot respond to the request soon enough. The NJDFW's Policy on Relocation of Wildlife states that if relocation of the mammal involved in a nuisance or damage problem will likely transfer the problem to the release site, then euthanasia should be considered, and conducted according to the methods found acceptable in the most recent Report of the American Veterinary Medical Association's Panel on Euthanasia (AVMA). The NJDFW does not consider beaver to be a vector species for the raccoon rabies strain that is currently endemic in New Jersey.

Beavers occur mostly in family groups that are comprised of 2 adult parents with 2-6 offspring from the current or previous breeding season. Average family group size has been documented as ranging from 3.0 to 9.2 (Novak et al. 1987). Beaver abundance has been reported in terms of families per kilometer of stream or per square kilometer of habitat. Novak et al. (1987) summarized reported beaver family abundance as ranging from 0.31 to 1.5 families per kilometer of stream, which converts to 0.5 - 2.4 families per mile of stream. Densities in terms of families per square kilometer have been reported to range from 0.15 to 3.9 (Novak et al. 1987), which is the same as 0.39 to 10.14 per square mile.

No population estimates were available for beavers in New Jersey. Therefore the best available information was used to estimate statewide populations. There are over 613,500 acres of freshwater wetlands in New Jersey (USFWS 2000) including an estimated minimum of 6,450 miles of streams (USEPA 1998). Using the conservative estimate of 3 beavers per family group and an abundance of 0.5 families per stream mile provided by Novak et al. (1987), the minimum statewide beaver population estimate for New Jersey could be estimated at 9,700 beavers.

The NJDFW's Furbearer and Upland Game Project reported that 501 beaver were harvested statewide during the 2003 recreational trapping seasons for beaver, that 3 Special Site Specific Permits were issued to take beaver (resulting in the take of 17 animals), and that the statewide population is increasing (A. Burnett, pers. comm., November 2003, Federal Aid Report). During 2003 the NJDFW WCU took 43 beaver from damage situations, did not issue any Special Wildlife Management Permits for beaver, and handled 128 requests for assistance with beaver-related problems.

Based upon an anticipated increase in requests for services, WS's lethal management of beaver in New Jersey would be expected to be no more than approximately 200 animals in any one year under the Proposed Action. Based on the above information, NJDFW oversight, and WS limited lethal take of beaver in New Jersey, WS should have minimal effects on local or statewide beaver populations.

### Muskrat

In NJ, muskrat are managed by the NJDFW as a furbearer. Muskrats may be trapped in the Northern Zone during mid-November through mid-March, in the Southern Zone during December through mid-March, and on Wildlife Management Areas during January through mid-March, with no daily limit (NJAC 7:25-5.8). In damage situations, a Special Wildlife Management Permit to Destroy Muskrat is issued to trappers by the NJDFW WCU that authorizes the take of muskrats to reduce property, natural resource, or other damage (NJAC 7:25-5.32). Typically, these permits allow the lethal take of an unspecified number of muskrats for a 30-day period, and require the trapper to report take to the WCU. Relocation of muskrats is not permitted by the NJDFW WCU. The NJDFW's Policy on Relocation of Wildlife states that if relocation of the mammal involved in a nuisance or damage problem will likely transfer the problem to the release site, then euthanasia should be considered, and conducted according to the methods found acceptable in the most recent Report of the American Veterinary Medical Association's (AVMA) Panel on Euthanasia. The NJDFW does not consider muskrats to be a vector species for the raccoon rabies strain that is currently endemic in New Jersey.

Muskrats are highly prolific and produce 3-4 litters per year that average 5-8 young per litter (Wade and Ramsey 1986) which makes them relatively immune to over harvest (Boutin and Birkenholz 1987). Harvest rates of from 3 to 8 per acre have been reported to be sustainable in muskrat populations (Boutin and Birkenholz 1987). Muskrat home ranges have been shown to vary from 529 sq. ft to 11,970 sq. ft. (0.1 to 0.25 acres) with the size of home ranges occupied by muskrats depending on habitat quality and population density (Boutin and Birkenholz 1987).

No population estimates were available for muskrat in New Jersey. Therefore the best available information was used to estimate statewide populations. There are over 613,500 acres of freshwater wetlands in New Jersey (USFWS 2000) including an estimated minimum of 6,450 miles of streams (USEPA 1998). Using the assumption that 50% of the wetlands support a muskrat population, an average home range of 0.25 acres per muskrat, only 1 muskrat occupies a home range, and no home ranges overlap, a conservative statewide muskrat population could be estimated at over 1.2 million muskrats.

The NJDFW's Furbearer and Upland Game Project reported that 36,402 muskrats were harvested by trappers during State Fiscal Year 2003 (July 1, 2002-June 30, 2003) in New Jersey, and that the statewide population is declining (A. Burnett, pers. comm., November 2003, Federal Aid Report). The NJDFW WCU reports that 19 Special Wildlife Management Permits to Destroy Muskrats were issued in 2003. During 2003, the NJDFW handled 40 requests for assistance/information from the public regarding muskrats.

Based upon an anticipated increase in requests for services, WS's lethal management of muskrats in New Jersey would be expected to be no more than approximately 100 animals in any one year under the Proposed Action. Based on the above information, NJDFW oversight, and WS limited lethal take of muskrats in New Jersey, WS should have minimal effects on local or statewide muskrat populations.

### Coyote

Coyotes are the largest wild canid in New Jersey, and are found in all 21 counties and in nearly 250 of the State's municipalities. In NJ, coyotes are managed by the NJDFW as a furbearer and a small game species. Coyotes may be trapped statewide during mid-November through mid-March, with no daily limit (NJAC 7:25-5.11). Additionally, they may be hunted during late September through early November (bow and arrow), November through mid-February (firearm or bow and arrow), and two weeks in February (shotgun only), with a daily limit of 2 animals (NJAC 7:25-5.19). In damage situations, property owners, dwelling occupants, farmers, and their

agents, may take coyotes (no State permit required) via lawful procedures to alleviate damage to property, agricultural resources (including livestock, crops, or poultry), and other resources (NJAC 7:25-5.21). Persons controlling coyotes under this regulation must notify the Regional Law Enforcement Offices of the NJDFW within 24 hours. Coyotes taken pursuant to NJAC 7:25-5.21 are usually shot or trapped, and NJ hunting/trapping licenses are not required to take coyotes pursuant to NJAC 7:25-5.21. In some situations, coyotes may be relocated by a very limited number of licensed rehabilitators in close consultation with the NJDFW pursuant to the NJDFW's Policy on Relocation of Wildlife.

The NJDFW's Furbearer and Upland Game Project reported that 95 coyotes were taken by hunters and trappers during State Fiscal Year 2003 (July 1, 2002-June 30, 2003) in New Jersey. The statewide population, estimated at 100 in 1975, is currently estimated at 3,000 coyotes (A. Burnett, pers. comm., November 2003, Federal Aid Report). Although they are present throughout the state, the highest densities occur in northwestern NJ (Sussex, Warren, Passaic, Morris, and Hunterdon Counties). During 2003, the NJDFW handled 70 requests for assistance/information from the public regarding, and received no verbal reports from farmers or others who had taken coyotes pursuant to NJAC 7:25-5.21.

Based upon an anticipated increase in requests for services, WS's lethal management of coyotes in New Jersey would be expected to be no more than approximately 30 animals in any one year under the Proposed Action. Based on the above information, NJDFW oversight, and WS limited lethal take of coyotes in New Jersey, WS should have minimal effects on local or statewide coyote populations.

### Red Fox

In NJ, red fox are managed by the NJDFW as a furbearer and a small game species. Red fox may be trapped statewide during mid-November through mid-March, with no daily limit (NJAC 7:25-5.11). Additionally, they may be hunted during late September through early November (bow and arrow) and during November through mid-February (firearm or bow and arrow), with no daily limit (NJAC 7:25-5.19). In damage situations, property owners, dwelling occupants, farmers, and their agents, may take red fox (no State permit required) via lawful procedures to alleviate damage to property, agricultural resources (including livestock, crops, or poultry), and other resources (NJAC 7:25-5.21). Red fox taken pursuant to NJAC 7:25-5.21 are usually shot or trapped, and NJ hunting/trapping licenses are not required to take red fox pursuant to NJAC 7:25-5.21. In some situations, red fox may be relocated by a very limited number of licensed rehabilitators in close consultation with the NJDFW pursuant to the NJDFW's Policy on Relocation of Wildlife. The NJDFW considers red fox to be a vector species for the raccoon rabies strain that is currently endemic in New Jersey.

The density of red fox populations is difficult to determine because of the animals secretive and elusive nature. Estimates are prone to error even in open prairie areas with good visibility. Methods used to estimate numbers have included aerial surveys, questionnaires to rural residents and mail carriers, scent post surveys, intensive ground searches, and indices derived from hunting and trapping harvest (Voigt 1987). In Great Britain, where food is superabundant in many urban areas, densities as high as 30 foxes / km<sup>2</sup> (78 / mi<sup>2</sup>) have been reported (Harris 1977, MacDonald and Newdick 1982, Harris and Rayner 1986), while in southern Ontario, densities of about 1 fox per square kilometer (2.6 / mi<sup>2</sup>) occur during spring. In small areas of the best habitat, 3 times as many foxes have been observed (Voigt 1987). However, these densities rarely occur extensively because of the dispersion of unsuitable habitat, high mortality, or the presence of competition such as coyotes (Voigt and Earle 1983). Cyclical changes in fox numbers occur routinely and complicate density estimates as well as management. These cycles can occur because of changes in prey availability, or disease outbreaks among red foxes. For fox populations to remain relatively stable, mortality and reproduction must balance approximately. Home ranges for red foxes in the eastern U. S. are usually from 500 - 2,000 ha. (1,250 - 5,000 acres) in rural settings

such as farmland (Voigt and Tinline 1980), but such sizes may not apply among fox populations in urban settings.

No population estimates were available for red foxes in New Jersey. Therefore the best available information was used to estimate statewide populations. There are over 3 million acres of rural land in New Jersey, with approximately 600,000 acres considered cropland (U.S. Census Bureau 1999). Using the assumption that 50% of the rural lands throughout the state have sufficient habitat to support red fox, foxes are only found in rural habitat, red fox densities are 1 fox per 250 acres, a conservative statewide red fox population could be estimated at over 6,000 foxes.

The NJDFW's Furbearer and Upland Game Project reported that 4540 fox were harvested during State Fiscal Year 2002 (July 1, 2001-June 30, 2002) in New Jersey; 2640 fox were taken by hunters and 1900 were taken by trappers. The red fox statewide population is stable but of unknown size (A. Burnett, pers. comm., November 2003, Federal Aid Report). During 2003, the NJDFW handled 110 requests for assistance/information from the public regarding fox.

Based upon an anticipated increase in requests for services, WS's lethal management of red fox in New Jersey would be expected to be no more than approximately 200 animals in any one year under the Proposed Action. Based on the above information, NJDFW oversight, and WS limited lethal take of red fox in New Jersey, WS should have minimal effects on local or statewide red fox populations.

#### **Rodents and Insectivores**

Rodents (mice, voles, etc.) and insectivores (shrews and moles) are taken by WS during wildlife hazard management, assessment, and monitoring at airports and airbases, since these species serve as attractants to birds such as vultures and hawks, which create direct hazards to public safety and aviation. Typically, take is associated with weeklong trapping sessions conducted by WS on airports during autumn and spring, or with operational prey base management activities to reduce hazards caused by avian predators or scavengers. The level of WS involvement in this work varies from year to year, depending on the number of airports requesting this assistance from WS. Additionally, these species may be taken in orchards and other cultivated areas to reduce damage to agricultural resources, such as apple trees and in other areas to protect human health and safety, property, or natural resources.

Vole species which are the target of WS activities at airports and other locations include meadow vole, pine vole, and red-backed vole/mouse. Mice which are the target of WS activities at airports and other locations include house mouse, deer mouse, white-footed mouse, woodland jumping mouse, and meadow jumping mouse. Others which are the target of WS activities at airports and other locations include Eastern mole, star-nosed mole, and short-tailed shrew. The following species are very prolific: meadow voles (up to 17 litters annually, typically 4-5 young per litter), house mouse (6 litters, 4-5 young each), white-footed mouse (multiple litters, 5 young each), deer mice (3-4 litters, 4-6 young each), and short-tailed shrews (2-3 litters, 5-7 young each) (Godin 1977). The following species have 1-2 litters per year: pine vole (2-4 young per litter), meadow jumping mice (5-6 young each), woodland jumping mouse (5 young each), Eastern mole (2-5 young each), and star-nosed mole (3-7 young each) (Godin 1977).

These nongame species (except the house mouse) are managed in NJ by the Division of Fish and Wildlife's Endangered and Nongame Species Program (ENSP), and their take is conducted pursuant to Depredation and Scientific Collection Permits issued by ENSP. Permits identify the species which can be taken at specific sites. Method of take for these species by WS would include trapping, use of chemical products such as Zinc Phosphide, and other legal methods (Appendix B). Removal of these species by WS would be done at specific sites (ie. Airports, orchards, etc.). Impacts of these activities to rodent and insectivore populations would be minimal due to the species' relatively high reproductive rates and because rodent/insectivore damage

management recommended and conducted by WS would be at specific local sites, via legal methods, and pursuant to permits.

Based on the above information and WS limited lethal take of rodents and insectivores in New Jersey, WS should have minimal effects on local or statewide populations.

#### **Other Target Species**

Other target species, in addition to the mammal species analyzed above, have been the subject of mammal damage management activities of WS. Some of these species have been killed in small numbers by WS during the past 3 years and have included no more than 20 individuals. These other target species could be killed during WS MDM activities.

Gray fox, porcupine and squirrels are managed by the NJDFW and WS take of these species is in accordance with permit and/or state laws and regulations. The NJDFW, as the agency with management responsibility, could impose restrictions on take as needed to assure cumulative take does not adversely affect the continued viability of populations. This should assure that cumulative impacts on these mammal populations would have no significant adverse impact on the quality of the human environment. Feral dogs, Norway rats and roof rats are not protected by Federal laws and regulations or by New Jersey's Title 23. Their take by WS is in accordance with WS policy, and local laws and regulations. Removal of feral cats will consist of live trapping and delivery to local animal control officers and/or animal shelters for handling.

Based upon an anticipated increase in future requests for WS assistance, WS predicts that no more than 20 individuals of these mammal species would be lethally removed annually under the proposed action. Feral cats would be trapped and delivered to animal control officers or shelters. Due to their relatively common occurrence throughout the state, NJDFW oversight (state protected species), and WS limited lethal take, none of the above mentioned mammal species are expected to be taken by WS MDM at any level that would adversely affect overall mammal populations on a local or statewide basis.

#### **4.1.1.3 Alternative 3: Non-lethal Mammal Damage Management Only by WS**

Under this alternative, WS would not take any target mammal species because no lethal methods would be used. Although WS lethal take of mammals would not occur, it is likely that without WS conducting some level of lethal MDM activities for these species, private MDM efforts would increase, leading to potentially similar or even greater effects on target species populations than those of the current program alternative. For the same reasons shown in the population effects analysis in section 4.1.1.2, however, it is unlikely that target mammal populations would be adversely impacted by implementation of this alternative. It is hypothetically possible that frustration caused by the inability to reduce damage and associated losses could lead to illegal use of other chemicals which could lead to real but unknown effects on target mammal populations. Effects and hypothetical risks of illegal chemical toxicant use under this alternative would probably be about the same as those under Alternative 1, but less than Alternative 4.

#### **4.1.1.4 Alternative 4: No Federal WS Mammal Damage Management**

Under this alternative, WS would have no impact on target mammal populations in the State. Private efforts to reduce or prevent depredations could increase which could result in effects on target species populations to an unknown degree. Effects on target species under this alternative could be the same, less, or more than those of the proposed action depending on the level of effort expended by private persons. For the same reasons shown in the population effects analysis in section 4.1.1.2, it is unlikely that target mammal populations would be adversely impacted by implementation of this alternative. It is hypothetically possible that frustration caused by the inability to reduce damage and associated losses could lead to illegal use of other chemicals which could lead to real but unknown effects on target mammal populations.

### **4.1.2 Effects on Other Wildlife Species, including T&E Species**

#### **4.1.2.1 Alternative 1: Technical Assistance Only**

Alternative 1 would not allow any WS direct operational MDM in New Jersey; therefore WS would not take any non-target species under this alternative. Threatened, endangered and rare birds (such as piping plovers, least terns, and black skimmers) would be negatively affected by this Alternative, since ongoing predation management programs to protect these birds that are conducted by WS currently would no longer occur. Technical assistance or self-help information would be provided at the request of producers and others. Although technical support might lead to more selective use of control methods by private parties than that which might occur under Alternative 4, private efforts to reduce or prevent depredations could still result in less experienced persons implementing control methods, leading to greater take of non-target wildlife than under the proposed action. It is hypothetically possible that, similar to Alternative 3 and 4, frustration caused by the inability to reduce damage and associated losses could lead to illegal use of chemical toxicants which could lead to unknown effects on local non-target species populations, including some T&E species. Hazards to raptors, including bald eagles, could therefore be greater under this alternative if chemicals that are less selective or that cause secondary poisoning are used by frustrated private individuals.

#### **4.1.2.2 Alternative 2: Integrated Mammal Damage Management Program (Proposed Action/No Action)**

Effects on Non-target (non-T&E) Species. Direct impacts on nontarget species occur if WS program personnel were to inadvertently kill, injure, or harass animals that are not target species. In general, these impacts result from the use of methods that are not completely selective for target species. Non-target species are usually not affected by WS's non-lethal management methods, except for the occasional scaring from harassment devices. In these cases, affected non-target wildlife may temporarily leave the immediate vicinity of scaring, but would most likely return after conclusion of the action.

There has been no lethal take of non-target species by WS while conducting MDM activities in New Jersey. WS take of non-target species during MDM activities is expected to be extremely low to non-existent. If take of nontarget species would occur, these occurrences are rare and should not affect the overall populations of any species under the current program. Any operational uses of MDM chemicals would be in accordance with labeling requirements under FIFRA and state pesticide laws and regulations that are established to avoid unreasonable adverse effects on the environment. Following labeling requirements and use restrictions are a built-in mitigation measure that would assure that use of registered chemical products would avoid significant adverse effects on non-target species populations.

WS personnel are experienced and trained in wildlife identification, and to select the most appropriate methods for taking targeted animals and excluding nontarget species. Shooting is

virtually 100% selective for the target species; therefore no adverse impacts are anticipated from use of this method. WS personnel use animal lures and set traps and snares in locations that are conducive to capturing target animals while minimizing potential impacts to nontarget species. Any non-target species captured unharmed in a live trap would be subsequently released on site. No adverse impacts from the use of registered pesticides and repellents are anticipated. Based on a thorough Risk Assessment, APHIS concluded that, when WS program chemical methods are used in accordance with label directions, they are highly selective to target individuals or populations, and such use has negligible effects on the environment (USDA 1997). Mitigation measures designed and implemented to avoid adverse effects on non-target species are described in Chapter 3.

**T&E Species Effects.** Special efforts are made to avoid jeopardizing T&E species through biological evaluations of the potential effects and the establishment of special restrictions or mitigation measures. WS has consulted with the USFWS under Section 7 of the ESA concerning potential impacts of MDM methods on T&E species and has obtained a Biological Opinion. For the full context of the Biological Opinion, see Appendix F of the ADC Final EIS (USDA 1997, Appendix F). For the preparation of this EA in 2003-2004, WS obtained and reviewed the list of federally listed T&E species for the state of New Jersey (Appendix C) and determined that the proposed WS MDM program would have no effect on certain Federal T&E species (Indiana bat, dwarf wedgemussel, northeastern beach tiger beetle, gray wolf, eastern cougar, Delmarva fox squirrel, Mitchell satyr butterfly, American burying beetle, bog asphodel, and Hirst panic grass) and would not likely adversely affect other species (bog turtle, roseate tern, piping plover, bald eagle, swamp pink, Knieskern's beaked-rush, small-whorled pogonia, American chaffseed, sensitive joint-vetch, and seabeach amaranth). For piping plovers, WS mammal damage management programs under the Proposed Actions would be beneficial, and are directed at piping plover recovery. The USFWS concurs with all of these determinations (Appendix D). Of the Federally listed sea turtles, only the loggerhead turtle is known to occasionally nest in NJ, and WS has determined that the Proposed Action will have no effect on this species. WS has determined that the proposed Action will have no effect on T&E marine species (hawksbill turtle, Atlantic ridley turtle, green turtle, and leatherback turtle), since no WS activities will occur in the ocean, or would otherwise affect the ocean.

WS has obtained and reviewed the list of New Jersey State listed T&E species, species of concern, and species of special interest (Appendix E). WS has determined, and the NJDFW has concurred, that the proposed WS MDM program is not likely to adversely impact any state listed endangered or threatened species, as long as the management techniques are not directed specifically at any state listed species (Appendix F). Additionally, WS has determined, and the NJDFW has concurred that certain aspects of the Proposed Action (mammal predation control programs to protect piping plovers, black skimmers, and least terns) may result in a direct benefit to state listed threatened and endangered species (Appendix F).

Mitigation measures to avoid T&E effects are described in Chapter 3 (Subsection 3.4.2) and are also described in Subsection 4.1.2 of this chapter.

#### **4.1.2.3 Alternative 3: Non-lethal Mammal Damage Management Only by WS**

Threatened and endangered birds (such as piping plovers, least terns, and black skimmers) would be negatively affected by this Alternative, since ongoing predation management programs to protect these birds that are conducted by WS currently would no longer occur. Under this alternative, WS take of non-target animals would hypothetically be less than that of the proposed action because no lethal control actions would be taken by WS. Non-target species are usually not affected by WS's non-lethal management methods, except for the occasional scaring from harassment devices. In these cases, affected non-target wildlife may temporarily leave the immediate vicinity of scaring, but would most likely return after conclusion of the action. However, if mammal damage problems were not effectively resolved by non-lethal control

methods, members of the public may resort to other means of lethal control such as the use of shooting or even illegal use of chemical toxicants. This could result in less experienced persons implementing control methods and could lead to greater take of non-target wildlife than the proposed action. For example, shooting by persons not proficient at mammal identification could lead to killing of non-target mammals. It is hypothetically possible that frustration caused by the inability to reduce damage and associated losses could lead to illegal use of chemical toxicants which could lead to unknown effects on local non-target species populations, including T&E species. Hazards to raptors, including bald eagles and falcons, could therefore be greater under this alternative if chemicals that are less selective or that cause secondary poisoning are used by frustrated private individuals.

#### **4.1.2.4 Alternative 4: No Federal WS Mammal Damage Management**

Alternative 4 would not allow any WS MDM in the State; therefore WS would not take any non-target species under this alternative. Threatened and endangered birds (such as piping plovers, least terns, and black skimmers) would be negatively affected by this Alternative, since ongoing predation management programs to protect these birds that are conducted by WS currently would no longer occur. Private efforts to reduce or prevent depredations could increase which could result in less experienced persons implementing control methods and could lead to greater take of non-target wildlife than under the proposed action. It is hypothetically possible that frustration caused by the inability to reduce damage and associated losses could lead to illegal use of chemical toxicants which could impact local non-target species populations, including some T&E species. Hazards to raptors, including bald eagles, could therefore be greater under this alternative if chemicals that are less selective or that cause secondary poisoning are used by frustrated private individuals.

### **4.1.3 Effects on Human Health and Safety**

#### **4.1.3.1 Safety and Efficacy of Chemical Control Methods**

##### **Alternative 1: Technical Assistance Only**

Alternative 1 would not allow any direct operational MDM assistance by WS in the State. Concerns about human health risks from WS's use of chemical MDM methods would be alleviated because no such use would occur. Private efforts to reduce or prevent damage would be expected to increase, resulting in less experienced persons implementing damage management methods and leading to a greater risk than the Proposed Action alternative. However, because some of these private parties would be receiving advice and instruction from WS, concerns about human health risks from chemical MDM methods use should be less than under Alternative 4. Hazards to humans and pets could be greater under this alternative if chemicals that are less selective or that cause secondary poisoning are used. It is hypothetically possible that frustration caused by the inability to alleviate mammal damage could lead to illegal use of certain toxicants that could pose secondary poisoning hazards to pets. Some chemicals that could be used illegally could present greater risks of adverse effects on humans than those used under the Proposed Action alternative.

##### **Alternative 2: Integrated Mammal Damage Management Program (Proposed Action/No Action)**

Zinc phosphide (ZnP), gas cartridges and large gas cartridges are the primary lethal chemicals that would be used by WS under the proposed program alternative. Gas cartridges and ZnP are used in WS MDM programs in New Jersey by WS personnel who are certified pesticide applicators, in accordance with label restrictions in a manner defined by application guidelines on the label. Based on a thorough Risk Assessment, APHIS concluded that, when WS Program chemical methods, including those referenced above, are used in accordance with label directions, they are



highly selective to target individuals or populations, and such use has negligible effects on the environment (USDA 1997). Therefore, MDM programs in New Jersey where such chemicals are used are not expected to adversely affect public safety. There have been no observed symptoms of chronic poisoning due to ZP exposure in humans.

Other MDM Chemicals. Non-lethal MDM chemicals that might be used or recommended by WS would include repellents such as Hinder, Magic Circle and others that are registered with the NJDEP Pesticide Control Program. Such chemicals must undergo rigorous testing and research to prove safety, effectiveness, and low environmental risks before they would be registered by the EPA or Food and Drug Administration (FDA). Any operational use of chemical repellents would be in accordance with labeling requirements under FIFRA and state pesticide laws and regulations which are established to avoid unreasonable adverse effects on the environment. Following labeling requirements and use restrictions are a built-in mitigation measure that would assure that use of registered chemical products would avoid significant adverse effects on human health.

Drugs used in capturing, sedating, handling, and euthanizing wildlife for wildlife management purposes include ketamine hydrochloride, a mixture of tiletamine and zolazepam (Telazol), xylazine (Rompun), sodium pentobarbital, potassium chloride, Yohimbine, antibiotics, and others. Meeting the requirements of the Animal Medicinal Drug Use Clarification Act (AMDUCA) should prevent any significant adverse impacts on human health with regard to this issue. Mitigation measures that would be part of the standard operating procedures include:

- All drugs used in capturing and handling wildlife would be under the direction and authority of state veterinary authorities, either directly or through procedures agreed upon between those authorities and APHIS-WS. As determined on a state-level basis by these veterinary authorities (as allowed by AMDUCA), wildlife hazard management programs may choose to avoid capture and handling activities that utilize immobilizing drugs within a specified number of days prior to the hunting or trapping season for the target species to avoid release of animals that may be consumed by hunters prior to the end of established withdrawal periods for the particular drugs used. Animals that had been drugged and released would be ear tagged or otherwise marked to alert hunters and trappers that they should contact state officials before consuming the animal.
- Most animals administered drugs would be released well before state controlled hunting/trapping seasons which would give the drug time to completely metabolize out of the animals' systems before they might be taken and consumed by humans. In some instances, animals collected for control purposes would be euthanized when they are captured within a certain specified time period prior to the legal hunting or trapping season to avoid the chance that they would be consumed as food while still potentially having immobilizing drugs in their systems.

By following these procedures in accordance with AMDUCA, wildlife management programs would avoid any significant impacts on human health with regard to this issue.

### **Alternative 3: Non-lethal Mammal Damage Management Only by WS**

Alternative 3 would not allow for any lethal mammal damage management by WS in New Jersey. WS could only implement non-lethal methods such as harassment and exclusion devices and materials. Non-lethal methods could, however, include use and recommendation of repellents. Impacts from WS use of these chemicals would be similar to those described under the proposed action.

Excessive cost or ineffectiveness of non-lethal techniques could result in some entities rejecting WS's assistance and resorting to other means of MDM. Such means could include illegal pesticide uses. Hazards to humans and pets could be greater under this alternative if chemicals

that are less selective or that cause secondary poisoning are used. Some chemicals that could be used illegally could present greater risks of adverse effects on humans than those used under the proposed alternative.

#### **Alternative 4: No Federal WS Mammal Damage Management**

Alternative 4 would not allow any WS MDM in New Jersey. Concerns about human health risks from WS's use of chemical MDM methods would be alleviated because no such use would occur. Private efforts to reduce or prevent damage would be expected to increase, resulting in less experienced persons implementing damage management methods and potentially leading to greater risk to human health and safety than the proposed action alternative. However, hazards to humans and pets could be greater under this alternative if other chemicals that are less selective or that cause secondary poisoning are used. It is hypothetically possible that frustration caused by the inability to alleviate mammal damage could lead to illegal use of certain toxicants that could pose secondary poisoning hazards to pets. Some chemicals that could be used illegally could present greater risks of adverse effects on humans than those used under the current program alternative.

#### **4.1.3.2 Impacts on Human Safety of Non-chemical MDM Methods**

##### **Alternative 1: Technical Assistance Only**

Under this alternative, WS would not engage in direct operational use of any non-chemical MDM methods. Risks to human safety from WS's use of firearms, traps, snares and pyrotechnics would hypothetically be lower than the Proposed Action alternative, since WS would not be conducting direct control activities. Hazards to humans and property could be greater under this alternative if personnel conducting MDM activities using non-chemical methods are poorly or improperly trained.

##### **Alternative 2: Integrated Mammal Damage Management Program (Proposed Action/No Action)**

Non-chemical MDM methods that might raise safety concerns include shooting with firearms, use of traps and snares, and harassment with pyrotechnics. Firearms are only used by WS personnel who are experienced in handling and using them. WS personnel receive safety training on a periodic basis to keep them aware of safety concerns. The New Jersey WS program has had no accidents involving the use of firearms, traps, snares or pyrotechnics in which any person was harmed. A formal risk assessment of WS's operational management methods found that risks to human safety were low (USDA 1997, Appendix P). Therefore, no adverse affects on human safety from WS's use of these methods is expected.

##### **Alternative 3: Non-lethal Mammal Damage Management Only by WS**

Under this alternative, non-chemical MDM methods that might raise safety concerns include shooting with firearms when used as a harassment technique, traps, snares and harassment with pyrotechnics. Firearms are only used by WS personnel who are experienced in handling and using them. WS personnel receive safety training on a periodic basis to keep them aware of safety concerns. The New Jersey WS program has had no accidents involving the use of firearms, traps, snares or pyrotechnics in which a member of the public or any other person was harmed. A formal risk assessment of WS operational management methods found that risks to human safety were low (USDA 1997, Appendix P). Therefore, no adverse affects on human safety from WS's use of these methods is expected.

#### **Alternative 4: No Federal WS Mammal Damage Management**

Alternative 4 would not allow any WS MDM in the State. Concerns about human health risks from WS's use of non-chemical MDM methods would be alleviated because no such use would occur. The use of firearms, traps, snares or pyrotechnics by WS would not occur in MDM activities in New Jersey. However, private efforts to reduce or prevent damage would be expected to increase, resulting in less experienced persons implementing damage management methods and potentially leading to greater risk to human health and safety than the proposed action alternative. Commercial pest control services would be able to use pyrotechnics, traps, snares or firearms in MDM programs and this activity would likely occur to a greater extent in the absence of WS assistance. Hazards to humans and property could be greater under this alternative if personnel conducting MDM activities using non-chemical methods are poorly or improperly trained.

#### **4.1.3.3 Effects on Human Health and Safety from Mammals**

##### **Alternative 1: Technical Assistance Only**

With WS technical assistance but no direct management, entities requesting MDM assistance for human health concerns would either take no action, which means the risk of human health problems would likely continue or increase in each situation as mammal numbers are maintained or increased, or implement WS recommendations for non-lethal and lethal control methods. Potential impacts would be variable. Individuals or entities that implement management actions may or may not have the experience necessary to efficiently and effectively conduct an effective MDM program. This potential risk would be less likely under this alternative than Alternative 4 when people requesting assistance receive and accept WS technical assistance recommendations.

##### **Alternative 2: Integrated Mammal Damage Management Program (Proposed Action/No Action)**

People are concerned with potential injury, illness, and loss of human life as a result of the potential impacts of injurious mammal species. An Integrated MDM strategy, a combination of lethal and non-lethal means, has the greatest potential of successfully reducing this risk. All MDM methods could possibly be implemented and recommended by WS.

An IWDM approach reduces damage or threats to public health or safety for people who would have no relief from such damage or threats if non-lethal methods were ineffective or impractical. As discussed in Chapter 1, mammals are a threat to aviation safety and can also carry or transmit diseases to humans. In most cases, it is difficult to conclusively prove that mammals were responsible for transmission of individual human cases or outbreaks of mammal-borne diseases. Nonetheless, certain requesters of MDM service may consider this risk to be unacceptable and may request such service primarily for that reason. In such cases, MDM, either by lethal or non-lethal means, would, if successful, reduce the risk of mammal-borne disease transmission at the site for which MDM is requested.

In some situations the implementation of non-lethal controls such as netting barriers and harassment could actually increase the risk of human health problems at other sites by causing the mammals to move to other sites not previously affected. In such cases, lethal removal of the mammals may actually be the best alternative from the standpoint of overall human health concerns in the local area. If WS is providing direct operational assistance in relocating mammals, coordination with local authorities may be conducted to assure they do not reestablish in other undesirable locations.

### **Alternative 3: Non-lethal Mammal Damage Management Only by WS**

Under this alternative, WS would be restricted to implementing and recommending only non-lethal methods in providing assistance with mammal damage problems. The success or failure of the use of non-lethal methods can be quite variable. In some situations the implementation of non-lethal controls such as netting barriers and harassment could actually increase the risk of human health problems at other sites by causing the mammals to move to other sites not previously affected. Some requesting entities, such as city government officials, would reject WS assistance for this reason and would likely seek to achieve mammal control by other means. However, if WS is providing direct operational assistance in relocating mammals, coordination with local authorities may be conducted to assure they do not re-establish in other undesirable locations.

### **Alternative 4: No Federal WS Mammal Damage Management**

With no WS assistance, cooperators would be responsible for developing and implementing their own MDM program. Cooperator efforts to reduce or prevent conflicts could result in less experienced persons implementing control methods, therefore leading to a greater potential of not reducing mammal hazards, than under the proposed action. In some situations the implementation of non-lethal controls such as netting barriers and harassment could actually increase the risk of human health problems at other sites by causing the mammals to move to other sites not previously affected. Under this alternative, human health problems could increase if private individuals were unable to find and implement effective means of controlling mammals that cause damage problems.

#### **4.1.4 Impacts to Stakeholders, including Aesthetics**

##### **4.1.4.1 Effects on Human Affectionate Bonds with Individual Mammals and on Aesthetic Values of Wild Mammal Species**

#### **Alternative 1: Technical Assistance Only**

Under this alternative, WS would not conduct any direct operational MDM, but would still provide technical assistance or self-help advice to persons requesting assistance with mammal damage. Additionally, WS would not conduct any harassment of mammals that were causing damage. Those who oppose direct operational assistance in wildlife damage management by the government, but favor government technical assistance, would favor this alternative. Persons who have developed affectionate bonds with individual wild mammals would not be affected by WS's activities under this alternative because this individual animal would not be killed by WS. However, other private entities would likely conduct MDM activities similar to those that would no longer be conducted by WS, which means the effects would then be similar to the Proposed Action alternative.

#### **Alternative 2: Integrated Mammal Damage Management Program (Proposed Action/No Action)**

Those who routinely view or feed individual animals would likely be disturbed by removal of such mammals under the current program. WS is aware of such concerns and takes these concerns into consideration to mitigate effects. WS may be able to mitigate such concerns by leaving certain animals that have been identified by interested individuals.

Some members of the public have expressed opposition to the killing of any mammals during MDM activities. Under this Proposed Action alternative, some lethal control of mammals would occur and these persons would be opposed. However, many persons who voice opposition have no direct connection or opportunity to view or enjoy the particular mammals that would be killed by WS's lethal control activities. Lethal control actions would generally be restricted to local sites

and to small, unsubstantial percentages of overall populations. Therefore, the species subjected to limited lethal control actions would remain common and abundant and would, therefore, continue to remain available for viewing by persons with that interest.

Lethal removal of mammals from airports should not affect the public's enjoyment of the aesthetics of the environment since airport properties are closed to public access. The ability to view and interact with mammals at these sites is usually either restricted to viewing from a location outside boundary fences or is forbidden.

### **Alternative 3: Non-lethal Mammal Damage Management Only by WS**

Under this alternative, WS would not conduct any lethal MDM, but may conduct harassment of mammals that are causing damage. Some people who oppose lethal control of wildlife by the government, but are tolerant of government involvement in non-lethal wildlife damage management would favor this alternative. Persons who have developed affectionate bonds with individual wild mammals would not be affected by the death of individual mammals under this alternative, but might oppose dispersal or translocation of certain mammals. WS may be able to mitigate such concerns by leaving certain animals that have been identified by interested individuals. In addition, the abundant populations of target mammals in urban environments would enable people to continue to view them and to establish affectionate bonds with individual animals. Although WS would not perform any lethal activities under this alternative, other private entities would likely conduct MDM activities similar to those that would no longer be conducted by WS, which means the effects would then be similar to the proposed action alternative.

### **Alternative 4: No Federal WS Mammal Damage Management**

Under this alternative, WS would not conduct any lethal removal of mammals nor would the program conduct any harassment of mammals. Those in opposition of any government involvement in wildlife damage management would favor this alternative. Persons who have developed affectionate bonds with individual wild mammals would not be affected by WS's activities under this alternative. However, other private entities would likely conduct MDM activities similar to those that would no longer be conducted by WS, which means the effects would then be similar to the proposed action alternative.

#### **4.1.4.2 Effects On Aesthetic Values of Property Damaged by Mammals**

##### **Alternative 1: Technical Assistance Only**

Wildlife Services would provide technical advice to those persons requesting assistance. Resource owners could use the information provided by WS or implement their own damage reduction program without WS technical assistance. When WS technical advice is requested and followed, impacts on those persons adversely affected by mammal damage should be less than Alternative 4. However, resource owners' efforts to reduce or prevent conflicts could result in less experienced persons implementing control methods. Therefore, mammal damage could be greater under this alternative than the proposed action alternative dependent upon the skills and abilities of the person implementing MDM control methods.

Relocation of mammals through harassment, barriers, or habitat alteration can sometimes result in the mammals causing the same problems at the new location. If WS has only provided technical assistance to local residents or municipal authorities, coordination with local authorities to monitor the mammal's movements to assure the mammals do not reestablish in other undesirable locations might not be conducted, thereby increasing the potential of adverse effects to nearby property owners.

#### **Alternative 2: Integrated Mammal Damage Management Program (Proposed Action/No Action)**

Damage to property would be expected to decrease under this alternative since all available damage management methods and strategies would be available for WS use and consideration.

Relocation or dispersal of mammals by harassment can sometimes result in the mammals causing the same or similar problems at the new location. If WS is providing direct operational assistance in relocating such mammals, coordination with local authorities may be conducted to assure they do not re-establish in other undesirable locations.

#### **Alternative 3: Non-lethal Mammal Damage Management Only by WS**

Under this alternative, WS would be restricted to implementing and recommending only non-lethal methods in providing assistance with mammal damage problems. The success or failure of the use of non-lethal methods can be quite variable. If non-lethal methods were ineffective at reducing damage, WS would not be able to provide any other type of assistance. In these situations, mammal damage would likely continue to increase unless resource owners implemented an effective MDM program in the absence of WS. Resource owners' efforts to reduce or prevent conflicts could result in less experienced persons implementing control methods. Therefore, mammal damage could be greater under this alternative than the proposed action alternative dependent upon the skills and abilities of the person implementing MDM control methods.

Assuming property owners would choose to allow and pay for the implementation of non-lethal methods, this alternative could result in mammals relocating to other sites where they would likely cause or aggravate similar problems for other property owners. Thus, this alternative would likely result in more property owners experiencing adverse effects on the aesthetic values of their properties than the Proposed Action alternative.

Relocation or dispersal of mammals by harassment can sometimes result in the mammals causing the same or similar problems at the new location. If WS is providing direct operational assistance in relocating such mammals, coordination with local authorities may be conducted to assure they do not re-establish in other undesirable locations.

#### **Alternative 4: No Federal WS Mammal Damage Management**

Mammal damage would likely continue to increase unless resource owners implemented an effective MDM program in the absence of WS. Resource owners could implement their own damage reduction program without WS assistance. Resource owners' efforts to reduce or prevent conflicts could result in less experienced persons implementing control methods. Therefore, adverse impacts could be greater under this alternative than the proposed action alternative dependent upon the skills and abilities of the person implementing MDM control methods.

Relocation of mammals through harassment, barriers, or habitat alteration can sometimes result in the mammals causing the same problems at the new location. Coordination of relocation and dispersal activities by local residents with local authorities to monitor the mammal's movements to assure the mammals do not re-establish in other undesirable locations might not be conducted, thereby increasing the potential of adverse effects to nearby property owners.

#### **4.1.5 Humaneness and Animal Welfare Concerns of Methods Used**

##### **4.1.5.1 Alternative 1: Technical Assistance Only**

Under this alternative, WS would provide self-help advice only. Lethal methods viewed as inhumane by some persons would not be used by WS. Resource owners could use the information provided by WS or implement their own damage reduction program without WS technical assistance. Many of the methods considered inhumane by some individuals and groups might still be used by resource owners. Overall impacts should be less than Alternative 4 when WS technical advice is requested and followed.

##### **4.1.5.2 Alternative 2: Implement an Integrated Mammal Damage Management Program (Proposed Action/No Action)**

MDM methods viewed by some persons as inhumane would be employed by WS under this alternative. These methods would include shooting, trapping, toxicants/chemicals, and snares. Despite SOPs designed to maximize humaneness, the perceived stress and trauma associated with being held in a trap or snare until the WS employee arrives at the capture site to dispatch or release the animal, is unacceptable to some persons. Other MDM methods used to take target animals including shooting and body-gripping traps (i.e., Conibear) result in a relatively humane death because the animals die instantly or within seconds to a few minutes. These methods however, are also considered inhumane by some individuals.

WS uses EPA registered and approved pesticides, such as Zinc phosphide and gas cartridges to manage damage caused by some mammals in New Jersey. Some individuals consider the use of such chemicals to be inhumane. Carbon monoxide, the active ingredient in gas cartridges, is recognized by the AVMA as an approved and humane euthanasia method to kill animals (AVMA 2001).

WS personnel are experienced, professional and humane in their use of management methods. Under this alternative, mammals would be trapped or shot by experienced WS personnel using the best and most appropriate method(s) available. Some animal rights activists may perceive this method as inhumane because they oppose all lethal methods of damage management.

WS has improved the selectivity and humaneness of management techniques through research and development. Research is continuing to bring new findings and products into practical use. Until new findings and products are found practical, a certain amount of animal suffering could occur when some MDM methods are used in situations where nonlethal damage management methods are not practical or effective.

##### **4.1.5.3 Alternative 3: Non-lethal Mammal Damage Management Only by WS**

Under this alternative, lethal methods, viewed as inhumane by some persons, would not be used by WS. Although WS would not perform any lethal activities under this alternative, other private entities would likely conduct MDM activities similar to those that would no longer be conducted by WS, resulting in impacts similar to the proposed action alternative.

##### **4.1.5.4 Alternative 4: No Federal WS Mammal Damage Management**

Under this alternative, lethal methods, viewed as inhumane by some persons, would not be used by WS. Although WS would not perform any lethal activities under this alternative, other private entities would likely conduct MDM activities similar to those that would no longer be conducted by WS, resulting in impacts similar to the proposed action alternative.

## **4.2 CUMULATIVE IMPACTS**

Cumulative impacts, as defined by CEQ (40 CFR 1508.7), are impacts to the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions.

Cumulative impacts may result from individually minor, but collectively significant, actions taking place over time.

Under Alternatives 1, 2 and 3, WS would address damage associated with mammals in a number of situations throughout the State. The WS MDM program would be the primary federal program with MDM responsibilities; however, some state and local government agencies may conduct MDM activities in New Jersey as well. Through ongoing coordination with these agencies, WS is aware of such MDM activities and may provide technical assistance in such efforts. WS does not normally conduct direct damage management activities concurrently with such agencies in the same area, but may conduct MDM activities at adjacent sites within the same time frame. In addition, commercial pest control companies may conduct MDM activities in the same area. The potential cumulative impacts analyzed below could occur either as a result of WS MDM program activities over time, or as a result of the aggregate effects of those activities combined with the activities of other agencies and individuals.

### **Cumulative Impacts on Wildlife Populations**

Mammal damage management methods used or recommended by the WS program in New Jersey will likely have no cumulative adverse effects on target and non-target wildlife populations. WS limited lethal take of target mammal species is anticipated to have minimal impacts on target mammal populations in New Jersey. When control actions are implemented by WS the potential lethal take of non-target wildlife species is expected to be minimal to non-existent.

### **Cumulative Impact Potential from Chemical Components**

MDM programs which include the use of pesticides as a lethal population management component may have the greatest potential for cumulative impacts on the environment as such impacts relate to deposit of chemical residues in the physical environment and environmental toxicosis. The toxicants ZnP, and gas cartridges are the chemicals most frequently used or recommended by the New Jersey WS MDM program for the purpose of obtaining lethal effects on mammals. These chemicals have been evaluated for possible residual effects which might occur from buildup of the chemicals in soil, water, or other environmental sites. Based on use patterns, the chemical and physical characteristics of mammal control toxicants, and factors related to the environmental fate of these pesticides, no cumulative impacts are expected from the lethal chemical components used or recommended by the WS MDM program in New Jersey.

Non-lethal chemicals, such as repellents, may also be used or recommended by the WS MDM program in New Jersey. Characteristics of these chemicals and use patterns indicate that no significant cumulative impacts related to environmental fate are expected from their use in WS MDM programs in New Jersey.

### **Cumulative Impact Potential from Non-chemical Components**

Non-chemical methods used or recommended by WS MDM program may include exclusion through use of various barriers, habitat modification of structures or vegetation, live trapping and relocation or euthanasia of mammals, harassment of mammals, trapping, snaring, and shooting. No cumulative impacts from WS use of these methods to take animals are expected, since take would be authorized and/or permitted with NJDFW oversight.



## SUMMARY

No significant cumulative environmental impacts are expected from any of the 4 alternatives. Under the Proposed Action, the lethal removal of mammals by WS would not have significant impacts on overall target mammal populations in New Jersey, but some local reductions may occur. No risk to public safety is expected when WS's services are provided and accepted by requesting individuals in Alternatives 1, 2, and 3, since only trained and experienced wildlife biologists/specialists would conduct and recommend MDM activities. There is a slight increased risk to public safety when persons who reject WS assistance and recommendations in Alternatives 1, 2 and 3 and conduct their own MDM activities, and when no WS assistance is provided in Alternative 4. In all 4 Alternatives, however, it would not be to the point that the impacts would be significant. Although some persons will likely be opposed to WS's participation in MDM activities on public and private lands within the state of New Jersey, the analysis in this EA indicates that WS Integrated MDM program will not result in significant cumulative adverse impacts on the quality of the human environment. Table 4-3 summarizes the expected impact of each of the alternatives on each of the issues.

Table 4-3. Summary of Potential Impacts.

Issue	Alternative 1 Technical Assistance Only	Alternative 2 Integrated Mammal Damage Management Program (Proposed Action/No Action)	Alternative 3 Nonlethal MDM Only by WS	Alternative 4 No Federal WS MDM Program
<b>1. Target Mammal Species Effects</b>	No effect by WS.  Low effect - reductions in local target mammal numbers by non-WS personnel likely; would not significantly affect local or state populations.	Low effect - reductions in local target mammal numbers; would not significantly affect local or state populations	No effect by WS.  Low effect - reductions in local target mammal numbers by non-WS personnel likely; would not significantly affect local or state populations.	No effect by WS.  Low effect - reductions in local target mammal numbers by non-WS personnel likely; would not significantly affect local or state populations.
<b>2. Effects on Other Wildlife Species, Including T&amp;E Species</b>	No effect by WS.  Impacts by non-WS personnel would be variable.  Some T&E bird species would be adversely affected.	Low effect - methods used by WS would be highly selective with very little risk to non-target species.  T&E bird species would continue to be protected from mammal predation.	Low effect - methods used by WS would be highly selective with very little risk to non-target species.  Some T&E bird species would be adversely affected.	No effect by WS.  Impacts by non-WS personnel would be variable.  Some T&E bird species would be adversely affected.
<b>3. Human Health and Safety Effects</b>	Efforts by non-WS personnel to reduce or prevent conflicts could result in less experienced persons implementing control methods, leading to a greater potential of not reducing mammal damage than under the proposed action.	The proposed action has the greatest potential of successfully reducing this risk.  Low risk from methods used by WS.	Impacts could be greater under this alternative than the proposed action.  Low risk from methods used by WS.	Efforts by non-WS personnel to reduce or prevent conflicts could result in less experienced persons implementing control methods, leading to a greater potential of negative human health and safety problems.
<b>4a. Aesthetic Values of Wild Mammal Species and Human Affectionate Bonds Effects</b>	Low to moderate effect. Local mammal numbers in damage situations would remain high or possibly increase unless non-WS personnel successfully implement lethal methods; no adverse affect on overall state target mammal populations.	Low to moderate effect at local levels; Some local populations may be reduced; WS mammal damage management activities do not adversely affect overall state target mammal populations.	Low to moderate effect. Local mammal numbers in damage situations would remain high or possibly increase when non-lethal methods are ineffective unless non-WS personnel successfully implement lethal methods; no adverse affect on state target mammal populations.	Low to moderate effect. Local mammal numbers in damage situations would remain high or possibly increase unless non-WS personnel successfully implement lethal methods; no adverse affect on overall state target mammal populations.
<b>4b. Aesthetic Values of Property Damaged by Mammals</b>	Moderate to High effect - mammal damage may not be reduced to acceptable levels; mammal may move to other sites which can create aesthetic damage problems at new sites.	Low effect - mammal damage problems most likely to be resolved without creating or moving problems elsewhere.	Moderate to High effect - mammal damage may not be reduced to acceptable levels; mammals may move to other sites which can create aesthetic damage problems at new sites. Less likely than Alt. 1 and 4.	High effect - mammal problems less likely to be resolved without WS involvement. Mammals may move to other sites which can create aesthetic damage problems at new sites
<b>5. Humaneness and Animal Welfare Concerns of Methods Used</b>	No effect by WS.  Impacts by non-WS personnel would be variable.	Low to moderate effect - methods viewed by some people as inhumane would be used by WS.	Lower effect than Alt. 2 since only non-lethal methods would be used by WS.  Impacts by non-WS personnel would be variable.	No effect by WS.  Impacts by non-WS personnel would be variable.

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## APPENDIX B. Mammal Damage Management Methods

Resource owners and government agencies use a variety of techniques as part of integrated mammal damage management programs. All lethal and non-lethal methods have limitations based on costs, logistics, practicality, or effectiveness. Mammal damage management methods currently available to the New Jersey WS program are described here. If other methods are proven effective and legal to use in New Jersey, they could be incorporated into the NJ WS program, pursuant to permits, other authorizations, agreements with landowners, NEPA compliance, and other laws, regulations, and policies.

### Nonchemical Wildlife Damage Management Methods

Nonchemical management methods consist primarily of tools or devices used to repel, capture or kill a particular animal or local population of wildlife to alleviate resource damage. Methods may be non-lethal (e.g., fencing, frightening devices, etc.) or lethal (e.g., firearms, Conibear traps, snares, etc.). If WS personnel apply these methods on private lands, an *Agreement for Control on Private Property* must be signed by the landowner or administrator authorizing the use of each damage management method. Nonchemical methods used by WS include:

**Exclusion** pertains to preventing access to resources through fencing or other barriers. Fencing of small critical areas can sometimes prevent animals which cannot climb from entering areas of protected resources. Fencing of culverts, drain pipes, and other water control structures can sometimes prevent beavers from building dams which plug these devices. In those applications, however, consideration must be given for water flow so that the fence does not act to catch and hold water-borne debris. Fencing, especially if it is installed with an underground skirt, can prevent access to areas for many mammal species which dig, including coyotes, foxes, woodchucks, beaver, and muskrat. Areas such as airports, yards or hay meadows may be fenced. Hardware cloth or other metal barriers can sometimes be used to prevent girdling and gnawing of valuable trees and to prevent the entry of mammals into buildings through existing holes or gaps. Construction of concrete spillways may reduce or prevent damage to dams by burrowing aquatic rodent species. Riprap can also be used on dams or levies at times, especially to deter muskrat, woodchucks, and other burrowing rodents. Electrical water barriers have proven effective in limited situations for beaver; an electrical field through the water in a ditch or other narrow channel, or hot-wire suspended just above the water level in areas protected from public access, have been effective at keeping beaver out. The effectiveness of an electrical barrier is extended when used in conjunction with an odor or taste cue that is emitted because beaver will avoid the area even if the electrical field is discontinued (Kolz and Johnson 1997). Similarly, electric fences of various constructions have been used effectively to reduce damage to various crops by deer, raccoons, bears and other species (Hygnstrom and Craven 1994, Boggess 1994).

**Cultural Methods and Habitat Management** includes the application of practices which seek to minimize exposure of the protected resource to damaging animals through processes other than exclusion. They may include animal husbandry practices such as employing guard dogs, herders, shed lambing, carcass removal, or pasture selection. Strategies may also include minimizing cover where damaging mammals might hide, manipulating the surrounding environment through barriers or fences to deter animals from entering a protected area, removing trees along stream banks to discourage the presence of beavers, removal of trees from around buildings to reduce access by squirrels and raccoons, or planting lure crops on fringes of protected crops. Continual destruction of beaver dams and removal of dam construction materials on a daily basis will sometimes cause beavers to move to other locations, although this strategy can be far more expensive than removing beavers in conjunction with dam removal. Water control devices such as the 3-log drain (Roblee 1983), the T-culvert guard (Roblee 1987), wire mesh culvert (Roblee 1983), and the Clemson beaver pond leveler (Miller and Yarrow 1994) can sometimes be used to control the water in beaver ponds to desirable levels that do not cause damage. Use of these devices is very limited among private landowners, but is sometimes done by the NJDFW in certain circumstances. Such methods have variable results and rarely provide acceptable levels of control unless used in an integrated program with other strategies.

Some mammals which cause damage in urban environments are attracted to homes by the presence of garbage or pet food left outside and unprotected. Removal or sealing of garbage in tight trash receptacles, and elimination of all pet foods from outside areas can reduce the presence of unwanted mammals. If raccoons and opossums are a problem, making trash and garbage unavailable and removing all pet food from outside during nighttime hours can reduce their presence. If tree squirrels are damaging property or causing a nuisance, care in preventing them from obtaining bird seed left in bird feeders can often greatly reduce their presence. This may mean hanging bird feeders by thin wire from tree limbs, or constructing mounting poles which cannot be climbed by these animals.

**Removal of Beaver Dams That Cause Flooding Damage** is generally conducted to maintain existing stream channels and drainage patterns, and reduce flood waters that have affected established forestry, agriculture, and livestock production activities or drainage structures such as culverts. Beaver dams are made from natural debris such as logs, sticks, and mud that beaver take from the immediate area. It is this portion that is dislodged during a beaver dam removal operation. The impoundments that could be removed would normally be from recent beaver activity and have not been in place long enough to take on the qualities of a true wetland (i.e. hydric soils, aquatic vegetation, preexisting function). Unwanted beaver dams can be removed by hand with a rake or power tools (e.g., a winch). Beaver dam removal by hand does not affect the substrate or the natural course of the stream and returns the area back to its preexisting condition with similar flows and circulations.

Because beaver dams involve waters of the United States, removal is regulated under Section 404 of the Clean Water Act, with which WS would comply if the NJDFW requests WS assistance in beaver dam removal activities. In most beaver dam breaching/removal operations, the material that is displaced is exempt from permitting or included in a Nationwide Permit (NWP) in accordance with Section 404 of the CWA (33 CFR Part 323 or 330). The landowner or cooperator would be required to obtain a 404 permit if the beaver dam breaching activity is not covered by a 404 permitting exemption or NWP and the area affected by the beaver dam was considered a true wetland.

**Lure crops/alternate foods** are crops planted or other food resources provided to mitigate the potential loss of higher value crops.

**Animal behavior modification** refers to tactics that deter or repel damaging mammals and thus, reduce damage to the protected resource. These techniques are usually aimed at causing target animals to respond by fleeing from the site or remaining at a distance. They usually employ extreme noise or visual stimuli. Unfortunately, many of these techniques are only effective for a short time before wildlife habituate to them (Conover 1982). Devices used to modify behavior in mammals include:

- electronic guards (siren strobe-light devices)
- propane exploders
- pyrotechnics
- laser lights
- human and animal effigies
- harassment / shooting into groups or herds

Use of propane exploders to reduce damage to agricultural resources in NJ requires the property owner/resource manager to first obtain a use permit from the NJDFW. Additionally, use of noise-making devices, and those that include bright illumination may be further restricted by county/municipal laws and regulations.

**Live Capture and Relocation** can be accomplished through the use of cage traps and snares to capture some species of mammals for the purpose of relocating them for release to wild sites or for delivery to animal control officers/shelters. WS sometimes uses these methods to conduct MDM programs in New Jersey when the target animal(s) can legally be relocated or can be captured and handled by WS personnel with relative safety. Live capture and handling of wild mammals poses an additional level of human health and safety threat if target animals are aggressive, large, or extremely sensitive to the close proximity of humans. For that reason, WS may limit this method to specific situations and certain species. Excessive populations may make this a poor

wildlife management strategy for some species. In addition, moving damage-causing individuals to other locations can typically result in damage at the new location, or the relocated individuals can move from the relocation site to areas where they are unwanted. The American Veterinary Medical Association, the National Association of State Public Health Veterinarians, and the Council of State and Territorial Epidemiologists all oppose the relocation of mammals because of the risk of disease transmission, particularly for small mammals such as raccoons or skunks (CDC 1990). In NJ, relocation of mammals is regulated by the NJDFW, as described in the document entitled, "NJDFW Policy on Relocation of Wildlife". The Policy identifies criteria for relocation and euthanasia (via AVMA-approved methods), and provides species-specific direction on release locations, distance from capture site, and other restrictions (see Section 1.1.8). An important aspect of the Policy is that euthanasia is preferred over relocation if that would result in transfer of the damage problem to the release site. Relocation is not necessarily precluded in all cases, and it would be evaluated by WS, through consultation with the NJDFW, on a case-by-case basis.

**Trapping** can utilize a number of devices, including small rodent (mouse, rat) snap traps, snares, cage traps, Hancock/Bailey traps, and Conibear (body-gripping) traps. For a description of these methods the reader is referred to the FEIS, Appendix J (USDA 1997). These techniques are usually implemented by WS personnel because of the technical training required to use such devices. Pursuant to NJSA Title 23 (23:4-22.1-.7) and regulations (NJAC 7:25-5.12), it is not legal in New Jersey to possess or take an animal with a steel-jaw leg hold trap. Below is a brief summary of trap and snare usage available for WS use and recommendation in NJ.

**Small Rodent Snap Traps** are typically used by WS in NJ to take field mice and other small rodents and insectivores during conduct of wildlife hazard assessments at airports. Snap traps are also frequently used to remove house mice and rats from buildings, including barns. Their use to control rats and house mice does not require permits, although their use to take field mice and insectivores does require a Scientific Collecting permit issued by the NJDFW.

**Snares** are capture devices comprised of a cable formed in a loop with a locking mechanism and placed strategically in travel ways. Most snares are also equipped with a swivel to minimize cable twisting and breakage. State regulations pertaining to the use of snares in NJ for furbearer trapping are contained in NJAC 7:25-5.12. Snaring is a legal method in NJ for the removal of certain wild mammal species in damage situations, pursuant to NJAC 7:25-5.21 and other State regulations.

**Cage traps** are live capture traps used to trap a variety of small to medium sized mammals. Cage traps come in a variety of sizes. They are made of galvanized wire mesh, and contain a treadle in the middle of the cage that triggers the door to close behind the animal being trapped. In NJ, wild mammals caught in cage traps pursuant to NJAC 7:25-5.21 may be relocated to other field locations (pursuant to the NJDFW Policy on Relocation of Wildlife), delivered to local animal control officers or shelters (dogs, cats), or euthanized according to AVMA-approved methods, including shooting and use of carbon dioxide.

**Hancock/Bailey Traps** (suitcase/basket type cage traps) are designed to live-capture beaver. The trap is constructed of a metal frame that is hinged with springs attached and covered with chain-link fence. The trap's appearance is similar to a large clam when closed. One advantage of using the Hancock or Bailey trap is the ease of release of beaver or non-target animals. Beaver caught in Hancock or Bailey traps could also be humanely euthanized. Disadvantages are that these traps are very expensive (\$300 per trap), cumbersome, and difficult to set (Miller and Yarrow 1994). The trap weighs about 25 pounds and is relatively bulky to carry and maneuver. Hancock and Bailey traps can also be dangerous to set (i.e., hardhats are recommended), are more expensive, and their use is more time-consuming than snares or body-gripping traps, and may cause serious and debilitating injury to river otters (Blundell et al. 1999). In NJ, Hancock/Bailey traps are sometimes used in situations where the NJDFW relocates beaver away from damage situations.

**Body-grip (e.g., Conibear-type) Traps** are designed to cause the quick death of the animal that activates the trap. The following trap sizes are typically used to harvest furbearers in NJ: beaver (Conibear 330), river otter (220), and muskrat (110). Placement is in travel ways or at lodge or burrow entrances created or

used by the target species. The animal is captured as it travels through the trap and activates the triggering mechanism. Safety hazards and risks to humans are usually related to setting, placing, checking, or removing the traps. Body-grip traps present a minor risk to non-target animals because of the placement in aquatic habitats and below the water surface. In NJ, pursuant to NJSA 23:4-38.2 and NJSA 23:4-38, Conibear traps must be submerged under water, while in use for trapping. In tidal water, Conibear traps must be completely covered by water at normal high tide. These State regulations identify trap specifications that must be adhered to for recreational trapping of furbearers.

**Shooting** is selective for target species and may involve the use of spotlights and either a handgun, shotgun or rifle. Shooting is an effective method to remove a small number of mammals in damage situations. Removal of specific animals in the problem area can sometimes provide immediate relief from a problem. Shooting is sometimes utilized as one of the first lethal damage management options because it offers the potential of resolving a problem more efficiently and selectively than some other methods, but it is not always effective. Shooting may sometimes be one of the only damage management options available if other factors preclude setting of damage management equipment. Firearm use may be a sensitive public concern because of issues relating to public safety. To ensure safe use and awareness, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within 3 months of their appointment and a refresher course every 2 years afterwards (WS Directive 2.615). WS employees who carry firearms as a condition of employment, are required to meet criteria contained in the Lautenberg Amendment which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence. WS activities where shooting is used include, but are not limited to, mammal control on airports, implementation of Community-Based Deer Management Plans (CBDMP), take of mammals as authorized in Permits to Kill Wild Deer and Special Wildlife Management Permits, and take of mammals in damage situations pursuant to NJAC 7:25-5.21.

**Community Based Deer Management Program (CBDMP).** In conduct of a CBDMP, WS works cooperatively with the NJDFW in compliance with State law (NJ Public Law 2000 Chapter 46) and regulation (NJAC 7:25-5.32), as described in Section 4.1.1.2 of this document. WS participation in CBDMP's to protect agriculture, human safety, and property at airports, agricultural areas, and in municipalities is initiated by requests for deer management assistance from airports, County Boards of Agriculture, and municipalities. WS works closely with the NJDFW in evaluating WS involvement in CBDMP's. Take of deer by WS under a CBDMP is authorized in permits granted to the program cooperator by the NJDFW. WS is included as an agent (subpermittee) on NJDFW-issued CBDMP permits. The number of deer, legal methods, and other restrictions on take are contained in the permit, and adhered to by WS. Methods and approaches utilized by WS during implementation of a CBDMP would include, but are not limited to the following: use of vehicles, illuminating devices, rifles, suppressors, elevated platforms, vehicles, and other methods and equipment. Approvals and notifications required by State law and regulation, including landowner permission for access, adjoining property notifications, and County prosecutor approval for the use of suppressors are obtained. Venison from deer taken by WS under a CBDMP would be processed and distributed for charitable human consumption, as permitted.

**Hunting/Trapping.** In many situations, WS recommends that resource owners consider legal hunting and trapping as an option for reducing mammal damage. Although legal hunting/trapping may be impractical and/or prohibited in many urban-suburban areas, it can be used to reduce some populations of mammals in certain situations. Hunting/trapping is recommended as a damage management tool wherever it is safe and legal, and would contribute to the effectiveness of an integrated management program. One example where hunting/trapping is recommended by WS is to reduce agricultural damage by deer in areas where WS is implementing a Community Based Deer Management (CBDMP) Program. In these cases, property/resource owners and managers are directed to the NJDFW for hunting season regulations, guidelines, and licenses.



## Chemical Wildlife Damage Management Methods

All pesticides used by WS are registered under the FIFRA and administered by the EPA and NJDEP Pesticide Control Program (NJPCP). In NJ during 2003, a total of 118 pesticide products for mammals are registered with the NJ PCP. Pesticides registered for use in NJ by the NJ PCP are used and recommended by WS. The number of products registered in NJ for various mammal species/species groups are listed here: rats (90 products), house mice (86), moles (17), woodchuck (9), voles (7), field mice (4), chipmunks (4), skunks (3), squirrels (2), red fox (1), coyote (1), and nutria (1). In many cases, one product is registered for use on multiple mammal species. All WS personnel in New Jersey who apply restricted - use pesticides are certified pesticide applicators and have specific training by WS for wildlife damage management pesticide use. The EPA and NJ DEP require pesticide applicators to adhere to all certification requirements set forth in the FIFRA. No chemicals are used by WS on public or private lands without authorization from the land management agency or property owner or manager.

The following pesticides have been proven to be selective and effective in reducing damage by mammals for which each pesticide is registered for use. Zinc phosphide and gas cartridges are chemical methods that are commonly used/recommended by WS in NJ; sedatives, anesthetics, and barbiturates have not been used by WS in NJ (to date), but may be used in the future as part of rabies management programs or other mammal damage control work. Federal, State, and local laws and regulations pertaining to their possession, storage, and use are adhered to by WS.

**Zinc phosphide (ZP)** is a rodenticide which is registered as a Restricted Use Pesticide (RUP) because of its hazard to non-target organisms and its acute oral toxicity (ExToxNet, 2003). RUPs may be purchased and used only by certified applicators.

ZP is an inorganic compound that is used to control rats, mice, voles, ground squirrels, prairie dogs, nutria, muskrats, feral rabbits, and gophers. It is also used as a tracking powder for the control of house mice. It is applied to crop areas and non-crop areas including lawns, golf courses, highway medians, and areas adjacent to wetlands. It may be formulated as a grain based bait, as scrap bait, or as a paste. Rodenticide baits usually contain 0.5 to 2.07% ZP, pastes approximately 5 to 10%.

ZP ingested orally reacts with water and acid in the stomach and produces phosphine gas, which may account in a large part for observed toxicity. In rats, the LD50 for the technical product (80 to 90% pure) is 40 mg/kg, while the LD50 values for lower concentration formulations are slightly higher, indicating lower acute toxicity [160]. In sheep the LD50 ranges from 60 to 70 mg/kg [160]. The compound is nonirritating to the skin and eyes [160]. Rats fed ZP over a wide range of doses experienced toxic effects. Increased liver, brain, and kidney weights, and lesions on these organs, were noted in rats exposed to around 14 mg/kg/day. Body hair loss, reduction in body weight, and reduction of food intake were all noted at 3.5 mg/kg/day. The study was conducted over 13 weeks. There have been no observed symptoms of chronic poisoning due to ZP exposure in humans. However, it has been suggested that chronic exposure to sub lethal concentrations for extended periods of time may produce toxic symptoms.

Small amounts of the rodenticide fed to experimental animals may have produced an 80% absorption of zinc as well. Zinc in sufficient concentrations may have an emetic effect. Hypophosphite may be excreted in the urine as a metabolite of ZP. There is little tendency for the compound to concentrate in living tissue, as it is readily converted to phosphine.

ZP is highly toxic to wild birds. The most sensitive birds are geese (LD50 of 7.5 mg/kg for the white-fronted goose). Pheasants, mourning doves, quail, mallard ducks, and the horned lark are also very susceptible to this compound. Blackbirds are less sensitive.

ZP is highly toxic to freshwater fish. The fish species which have been evaluated include bluegill sunfish (LC50 of 0.8 mg/L) and rainbow trout (LC50 of 0.5 mg/L) [1]. Carp were also found to be susceptible to ZP, especially in weakly acidic water.

ZP is also toxic to non-target mammals when ingested directly. Nearly 60 studies have been conducted on the toxicity of this rodenticide to wild animals. Secondary toxicity to mammalian predators (animals eating other animals that had been exposed to the compound) from ZP is rather low, primarily because the compound does not significantly accumulate in the muscles of target species. Some of the toxic effects to predators have been due to the ingestion of ZP that was in the digestive tract of the target organism. Studies on secondary organisms have focused on coyotes, fox, mink, weasels, and birds of prey. Under field conditions, most of the toxic effects to non-target wildlife are due to direct exposures resulting from misuse or misapplication of this rodenticide.

ZP is used in WS MDM programs in New Jersey in accordance with label restrictions in a manner defined by application guidelines on the label. Application procedures and baits used are determined by formulations allowed by labeling and the species targeted. Most ZP applications in New Jersey would be for vole damage management, although some applications for Norway rats and other species may be conducted.

In NJ, WS has registered Zinc Phosphide Concentrate for Rodent and Lagamorph Control (EPA Reg. No. 56228-6) with the NJDEP Pesticide Control Program (PCP), which is labeled for control of voles, mice, muskrats, woodchucks, and other species in a variety of locations (including lawns, golf courses, pastures, nurseries, vineyards, orchards, buildings, berry productions areas, etc.).

The **Gas Cartridge** (EPA Reg. No. 56228-2) and **Large Gas Cartridge** (EPA Reg. No. 56228-21) are registered as fumigants by the EPA, and are used in conjunction with denning operations. Both of these products are registered by WS with the NJDEP PCP. When ignited, the cartridge burns in the den of an animal and produces large amounts of carbon monoxide, a colorless, odorless, and tasteless, toxic gas. The combination of oxygen depletion and carbon monoxide exposure kills the animals in the den. Carbon monoxide euthanasia is recognized by the AVMA as an approved and humane method to kill animals (AVMA 2001). The gas cartridge is registered for control of woodchucks, marmots, ground squirrels, and prairie dogs, and the large gas cartridge is registered for control of coyotes, red fox, and striped skunks in dens.

CO<sub>2</sub> is sometimes used to euthanize mammals which are captured in live traps and when relocation is not a feasible option. Live mammals are placed in an enclosed space which is then sealed shut. CO<sub>2</sub> gas under pressure is released into the enclosure and the animal quickly expires after inhaling the gas. This method is approved as a euthanizing agent by the American Veterinary Medical Association (AVMA 2001), and it and other AVMA-approved methods may be used to euthanize mammals taken pursuant to NJAC 7:25-5.21 and the NJDFW Policy on Relocation of Wildlife. CO<sub>2</sub> gas is a byproduct of animal respiration, is common in the atmosphere, and is required by plants for photosynthesis. It is nonflammable, nonexplosive, and poses minimal hazard to personnel. Importantly, it does not accumulate in tissue residues in animals destined for human consumption. CO<sub>2</sub> is used to carbonate beverages for human consumption and is also the gas released by dry ice. The AVMA lists the use of compressed CO<sub>2</sub> gas in cylinders as acceptable for the following animals: amphibians, birds, cats, dogs, fish, furbearers, rabbits, certain reptiles, swine, and zoo animals. The use of CO<sub>2</sub> by WS for euthanasia purposes is exceedingly minor and inconsequential to the amounts used for other purposes by society. No Federal or New Jersey licenses or permits are required for the use of CO<sub>2</sub> to euthanize wildlife or other animals.

**Ketamine hydrochloride** is a dissociative anesthetic that is used to capture wildlife, primarily mammals, birds, and reptiles. It is used to eliminate pain, calm fear, and allay anxiety. Ketamine is possibly the most versatile drug for chemical capture, and it has a wide safety margin (Fowler and Miller 1999). When used alone, this drug may produce muscle tension, resulting in shaking, staring, increased body heat, and, on occasion, seizures. Usually, ketamine is combined with other drugs such as xylazine. The combination of such drugs is used to control an animal, maximize the reduction of stress and pain, and increase human and animal safety. Both Federal (Drug Enforcement Administration) and State (New Jersey Department of Law and Public Safety, Division of Consumer Affairs, Drug Control Unit) Controlled Dangerous Substance (CDS) licensing requirements must be met in order to possess and use this Schedule III drug in New Jersey.

**Xylazine** (Rompun) is a sedative (analgesic) that calms nervousness, irritability, and excitement, usually by depressing the central nervous system. Xylazine is commonly used with ketamine to produce a relaxed anesthesia. It can also be used alone to facilitate physical restraint. Because xylazine is not an anesthetic, sedated animals are usually responsive to stimuli. Therefore, personnel should be even more attentive to minimizing sight, sound, and touch. When using ketamine/xylazine combinations, xylazine will usually overcome the tension produced by ketamine, resulting in a relaxed, anesthetized animal (Fowler and Miller 1999). This reduces heat production from muscle tension, but can lead to lower body temperatures when working in cold conditions. No DEA or CDS licenses are required to possess and use xylazine in New Jersey.

**Yohimbine** is a reversal agent for xylazine, and is typically administered to the animal approximately 45 minutes after the ketamine/xylazine dose. No DEA or CDS licenses are required to possess and use yohimbine in New Jersey.

**Sodium Pentobarbital** and its derivatives are barbiturates that rapidly depress the central nervous system to the point of respiratory arrest. Some states may have additional requirements for personnel training and particular sodium pentobarbital products available for use in wildlife. Nationally, certified WS personnel are authorized to use sodium pentobarbital and dilutions for euthanasia in accordance with DEA regulations. Both Federal (Drug Enforcement Administration) and State (New Jersey Department of Law and Public Safety, Division of Consumer Affairs, Drug Control Unit) Controlled Dangerous Substance (CDS) licensing requirements must be met in order to possess and use this Schedule II drug in New Jersey.

**Potassium Chloride** used in conjunction with prior general anesthesia is used as a euthanasia agent for animals, and is considered acceptable and humane by the AVMA (AVMA 2001). Animals that have been euthanized with this chemical experience cardiac arrest followed by death, and are not toxic to predators or scavengers. No DEA or CDS licenses are required to possess and use potassium chloride in New Jersey.

**Repellents** are usually naturally occurring substances or chemicals formulated to be distasteful or to elicit pain or discomfort for target animals when they are smelled, tasted, or contacted. Only a few repellents are commercially available for mammals, and are registered for only a few species. Repellents are not available for many species which may present damage problems, such as some predators or furbearing species. Repellents are variably effective and depend to a great extent on resource to be protected, time and length of application, and sensitivity of the species causing damage. Acceptable levels of damage control are usually not realized unless repellents are used in conjunction with other techniques, as part of an integrated damage management program. In NJ, repellents must be registered with the NJDEP Pesticide Control Program (NJ PCP). During 2003, a total of 62 mammal repellents are registered with the NJ PCP. The number of repellents registered for various mammal species/species groups are listed here: dogs (28), cats (24), rabbits (includes Eastern cottontail) (24), white-tailed deer (20), squirrel (8), rodents (4), meadow mice (3), moles (Eastern and star-nosed) (3), black bear (2), field mice (1), house mouse (1), raccoon (1), meadow vole (1), and rats (1).

**Table B.1. List of Example Mammal Repellents Available in NJ**

<b>Mammal Species</b>	<b>Example Repellents*</b>
White-tailed Deer	Deer-Away Big Game Repellent Deer-Off Repellent Concentrate Hinder Rabbit and Deer Repellent
Squirrel	Miller Hot Sauce Animal Repellent Squirrel Away
Field Mice	Chaperone Rabbit and Deer Repellent
Moles	Scoot Mole Evacuator
Raccoon	Outdoor Animal Repellent
Vole	Miller Hot Sauce Animal Repellent

\* All repellents listed may be variably effective in reducing damage and may have other effects on surfaces where applied, and on other animals or plants. Read labels carefully.

Appendix C. Federally Listed Threatened and Endangered Species in New Jersey



# FEDERALLY LISTED ENDANGERED AND THREATENED SPECIES IN NEW JERSEY



An **ENDANGERED** species is any species that is in danger of extinction throughout all or a significant portion of its range.

A **THREATENED** species is any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

	COMMON NAME	SCIENTIFIC NAME	STATUS
FISHES	Shortnose sturgeon*	<i>Acipenser brevirostrum</i>	E
REPTILES	Bog turtle	<i>Clemmys muhlenbergii</i>	T
	Atlantic Ridley turtle*	<i>Lepidochelys kempii</i>	E
	Green turtle*	<i>Chelonia mydas</i>	T
	Hawksbill turtle*	<i>Eretmochelys imbricata</i>	E
	Leatherback turtle*	<i>Dermochelys coriacea</i>	E
	Loggerhead turtle*	<i>Caretta caretta</i>	T
BIRDS	Bald eagle	<i>Haliaeetus leucocephalus</i>	T
	Piping plover	<i>Charadrius melodus</i>	T
	Roseate tern	<i>Sterna dougallii dougallii</i>	E
MAMMALS	Eastern cougar	<i>Felis concolor cougar</i>	E+
	Indiana bat	<i>Myotis sodalis</i>	E
	Gray wolf	<i>Canis lupus</i>	E+
	Delmarva fox squirrel	<i>Sciurus niger cinereus</i>	E+
	Blue whale*	<i>Balaenoptera musculus</i>	E
	Finback whale*	<i>Balaenoptera physalus</i>	E
	Humpback whale*	<i>Megaptera novaeangliae</i>	E
	Right whale*	<i>Balaena glacialis</i>	E
	Sei whale*	<i>Balaenoptera borealis</i>	E
	Sperm whale*	<i>Physeter macrocephalus</i>	E

	COMMON NAME	SCIENTIFIC NAME	STATUS
INVERTEBRATES	Dwarf wedgemussel	<i>Alasmidonta heterodon</i>	E
	Northeastern beach tiger beetle	<i>Cicindela dorsalis dorsalis</i>	T
	Mitchell saytr butterfly	<i>Neonympha m. mitchellii</i>	E+
	American burying beetle	<i>Nicrophorus americanus</i>	E+
PLANTS	Small whorled pogonia	<i>Isotria medeoloides</i>	T
	Swamp pink	<i>Helonias bullata</i>	T
	Knieskern's beaked-rush	<i>Rhynchospora knieskernii</i>	T
	American chaffseed	<i>Schwalbea americana</i>	E
	Sensitive joint-vetch	<i>Aeschynomene virginica</i>	T
	Seabeach amaranth	<i>Amaranthus pumilus</i>	T

STATUS:			
E	endangered species	PE	proposed endangered
T	threatened species	PT	proposed threatened
+	presumed extirpated**		

\* Except for sea turtle nesting habitat, principal responsibility for these species is vested with the National Marine Fisheries Service.

\*\* Current records indicate the species does not presently occur in New Jersey, although the species did occur in the State historically.

*Note: for a complete listing of Endangered and Threatened Wildlife and Plants, refer to 50 CFR 17.11 and 17.12.*

For further information, please contact:

U.S. Fish and Wildlife Service  
New Jersey Field Office  
927 N. Main Street, Building D  
Pleasantville, New Jersey 08232  
Phone: (609) 646-9310  
Fax: (609) 646-0352

Revised 12/06/00



## FEDERAL CANDIDATE SPECIES IN NEW JERSEY

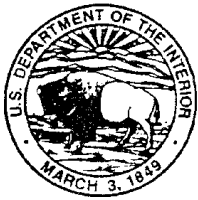
CANDIDATE SPECIES are species that appear to warrant consideration for addition to the federal List of Endangered and Threatened Wildlife and Plants. Although these species receive no substantive or procedural protection under the Endangered Species Act, the U.S. Fish and Wildlife Service encourages federal agencies and other planners to give consideration to these species in the environmental planning process.

SPECIES	SCIENTIFIC NAME
Bog asphodel	<i>Narthecium americanum</i>
Hirst's panic grass	<i>Panicum hirstii</i>

Note: For complete listings of taxa under review as candidate species, refer to Federal Register Vol. 64, No. 205, October 25, 1999 (Endangered and Threatened Wildlife and Plants; Review of Plant and Animal Taxa that are Candidates for Listing as Endangered or Threatened Species).

Appendix D. Correspondence from USFWS Regarding Federal T&E Species





# United States Department of the Interior

## FISH AND WILDLIFE SERVICE

New Jersey Field Office  
Ecological Services  
927 North Main Street, Building D  
Pleasantville, New Jersey 08232  
Tel: 609/646 9310  
Fax: 609/646 0352  
<http://njfieldoffice.fws.gov>



In Reply Refer to:

ES-03/661

FEB - 2 2004

Janet L. Bucknall, State Director  
APHIS Wildlife Services  
U.S. Department of Agriculture  
140-C Locust Grove Road  
Pittstown, New Jersey 08867

Dear Ms. Bucknall:

This responds to your December 18, 2003 request to the U.S. Fish and Wildlife Service (Service) for review of potential impacts to federally listed threatened and endangered, or candidate species, from implementation of the U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services mammal damage management program in New Jersey.

### AUTHORITY

This response is provided pursuant to Section 7 of the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) (ESA) to ensure the protection of federally listed endangered and threatened species. These comments do not address all Service concerns for fish and wildlife resources and do not preclude separate review and comments by the Service as afforded by the Fish and Wildlife Coordination Act (48 Stat. 401; 16 U.S.C. 661 *et seq.*), if project implementation requires a permit from the U.S. Army Corps of Engineers pursuant to the Clean Water Act of 1977 (33 U.S.C. 1344 *et seq.*); pursuant to the December 22, 1993 Memorandum of Agreement among the U.S. Environmental Protection Agency, New Jersey Department of Environmental Protection (NJDEP), and the Service, if project implementation requires a permit from the NJDEP pursuant to the New Jersey Freshwater Wetlands Protection Act (N.J.S.A. 13:9B *et seq.*); nor do they preclude comments on any forthcoming environmental documents pursuant to the National Environmental Policy Act of 1969 as amended (83 Stat. 852; 42 U.S.C. 4321 *et seq.*).

## SERVICE CONCURRENCE

The Service has reviewed the USDA, APHIS mammal damage management program and your analysis of potential impacts to federally listed and candidate species. The USDA mammal damage management program includes proposed conservation measures to avoid impacts to federally listed species when working in areas of known species occurrence. Additionally, although no adverse impacts to federally listed species are anticipated from program implementation, the USDA proposes to conduct individual consultation pursuant to the ESA with the Service for any project that may affect federally listed species.

Based upon a review of the information provided, the Service concurs with your determination of no effect for the Indiana bat (*Myotis sodalis*), dwarf wedgemussel (*Alasmidonta heterodon*), northeastern beach tiger beetle (*Cicindela dorsalis dorsalis*), gray wolf (*Canis lupus*), eastern cougar (*Felis concolor cougar*), Delmarva fox squirrel (*Sciurus niger cinereus*), Mitchell satyr butterfly (*Neonympha mitchellii*), American burying beetle (*Nicrophorus americanus*), bog asphodel (*Narthecium americanum*), and Hirsts' panic grass (*Panicum hirstii*) and your determination of not likely to adversely affect the bog turtle (*Clemmys muhlenbergii*), roseate tern (*Sterna dougallii dougallii*), piping plover (*Charadrius melodus*), bald eagle (*Haliaeetus leucocephalus*), swamp pink (*Helonias bullata*), Knieskern's beaked-rush (*Rhynchospora knieskernii*), small-whorled pogonia (*Isotria medeoloides*), American chaffseed (*Schwalbea americana*), sensitive joint-vetch (*Aeschynomene virginica*), and seabeach amaranth (*Amaranthus pumilus*). If additional information on listed and proposed species becomes available, or if project plans change, this determination may be reconsidered.

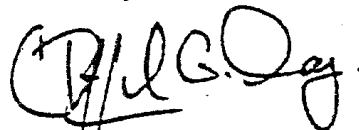
## MARINE SPECIES

The Service provides the above determination with respect to federally listed threatened or endangered flora and fauna under Service jurisdiction only. Except for sea turtle nesting habitat, principal responsibility for threatened and endangered marine species, is vested with the National Marine Fisheries Services (NMFS). Of the federally listed sea turtles known to occur within New Jersey, only the loggerhead turtle (*Caretta caretta*) is known to occasionally nest within the State. The Service concurs with your determination of no effect to nesting habitat for the loggerhead turtle from the USDA, APHIS mammal damage management program. To fulfill consultation requirements for marine species pursuant to Section 7(a)(2) of the ESA, the NMFS must be contacted at the following address:

National Marine Fisheries Service  
Habitat and Protected Resources Division  
Sandy Hook Laboratory  
Highlands, New Jersey 07732  
(732) 872 - 3023

Please contact Annette Scherer of my staff at (609) 646-9310, extension 34 if you have any questions or require further assistance regarding threatened or endangered species.

Sincerely,

A handwritten signature in black ink, appearing to read "Clifford G. Day". The signature is stylized with a large "C" and "D".

Clifford G. Day  
Supervisor

Appendix E. State Listed Threatened and Endangered Species in New Jersey

## New Jersey Division of Fish and Wildlife



# Conserve Wildlife

N.J. Division of Fish & Wildlife  
Endangered & Nongame Species Program



## New Jersey's Endangered and Threatened Wildlife

**Endangered Species** are those whose prospects for survival in New Jersey are in immediate danger because of a loss or change in habitat, over-exploitation, predation, competition, disease, disturbance or contamination. Assistance is needed to prevent future extinction in New Jersey.

**Threatened Species** are those who may become endangered if conditions surrounding them begin to or continue to deteriorate.

Species names link to PDF documents containing identification, habitat, and status and conservation information. Use the Adobe Acrobat Reader to view and print these documents. The Reader is available free from [Adobe's Web site](http://www.adobe.com).

BIRDS			
Endangered		Threatened	
<a href="#">Bittern, American</a>	<a href="#">Botaurus lentiginos</a> BR	<a href="#">Bobolink</a>	<a href="#">Dolichonyx oryzivorus</a> BR
<a href="#">Eagle, bald</a>	<a href="#">Haliaeetus leucocephalus</a> BR **	<a href="#">Eagle, bald</a>	<a href="#">Haliaeetus leucocephalus</a> NB **
<a href="#">Falcon, peregrine</a>	<a href="#">Falco peregrinus</a>	<a href="#">Hawk, Cooper's</a>	<a href="#">Accipiter cooperii</a>
<a href="#">Goshawk, northern</a>	<a href="#">Accipiter gentilis</a> BR	<a href="#">Hawk, red-shouldered</a>	<a href="#">Buteo lineatus</a> NB
<a href="#">Grebe, pied-billed</a>	<a href="#">Podilymbus podiceps</a> *	<a href="#">Night-heron, black-crowned</a>	<a href="#">Nycticorax nycticorax</a> BR
<a href="#">Harrier, northern</a>	<a href="#">Circus cyaneus</a> BR	<a href="#">Night-heron, yellow-crowned</a>	<a href="#">Nyctanassa violaceus</a>
<a href="#">Hawk, red-shouldered</a>	<a href="#">Buteo lineatus</a> BR	<a href="#">Knot, red</a>	<a href="#">Calidris canutus</a> BR
<a href="#">Owl, short-eared</a>	<a href="#">Asio flammeus</a> BR	<a href="#">Osprey</a>	<a href="#">Pandion haliaetus</a> BR
<a href="#">Plover, piping</a>	<a href="#">Charadrius melodus</a> **	<a href="#">Owl, barred</a>	<a href="#">Strix varia</a>
<a href="#">Sandpiper, upland</a>	<a href="#">Batramia longicauda</a>	<a href="#">Owl, long-eared</a>	<a href="#">Asio otus</a>
<a href="#">Shrike, loggerhead</a>	<a href="#">Lanius ludovicianus</a>	<a href="#">Rail, black</a>	<a href="#">Laterallus jamaicensis</a>
<a href="#">Skimmer, black</a>	<a href="#">Rynchops niger</a> BR	<a href="#">Skimmer, black</a>	<a href="#">Rynchops niger</a> NB
<a href="#">Sparrow, Henslow's</a>	<a href="#">Ammodramus henslowii</a>	<a href="#">Sparrow, grasshopper</a>	<a href="#">Ammodramus savannarum</a> BR
<a href="#">Sparrow, vesper</a>	<a href="#">Pooecetes gramineus</a> BR	<a href="#">Sparrow, Savannah</a>	<a href="#">Passerculus sandwichensis</a> BR
<a href="#">Tern, least</a>	<a href="#">Sterna antillarum</a>	<a href="#">Sparrow, vesper</a>	<a href="#">Pooecetes gramineus</a> NB
<a href="#">Tern, roseate</a>	<a href="#">Sterna dougallii</a> **	<a href="#">Woodpecker, red-headed</a>	<a href="#">Melanerpes erythrocephalus</a>

Wren, sedge	<i>Cistothorus platensis</i>
**Federally endangered or threatened	
BR - Breeding population only; NB - non-breeding population only	

REPTILES			
Endangered		Threatened	
Rattlesnake, timber	<i>Crotalus h. horridus</i>	Snake, northern pine	<i>Pituophis m. melanoleucus</i>
Snake, corn	<i>Elaphe g. guttata</i>	Turtle, Atlantic green	<i>Chelonia mydas</i> **
Turtle, bog	<i>Clemmys muhlenbergii</i> **	Turtle, wood	<i>Clemmys insculpta</i>
Atlantic hawksbill	<i>Eretmochelys imbricata</i> **		
Atlantic leatherback	<i>Dermochelys coriacea</i> **		
Atlantic loggerhead	<i>Caretta caretta</i> **		
Atlantic Ridley	<i>Lepidochelys kemp</i> **		
**Federally endangered or threatened			

AMPHIBIANS			
Endangered		Threatened	
Salamander, blue-spotted	<i>Ambystoma laterale</i>	Salamander, eastern mud	<i>Pseudotriton montanus</i>
Salamander, eastern tiger	<i>Ambystoma tigrinum</i>	Salamander, long-tailed	<i>Eurycea longicauda</i>
Salamander, Tremblay's	<i>Ambystoma tremblayi</i>		
Treefrog, pine barrens	<i>Hyla andersonii</i>		
Treefrog, southern gray	<i>Hyla chrysocelis</i>		

INVERTEBRATES			
Endangered		Threatened	
Beetle, American burying	<i>Nicrophorus mericanus</i> **	Elfin, frosted (butterfly)	<i>Callophrys</i>
Beetle, northeastern beach tiger	<i>Cincindela d. dorsalis</i> **	Floater, triangle (mussel)	<i>Alasmodonta undulata</i>
Copper, bronze	<i>Lycaena hyllus</i>	Fritillary, silver-bordered (butterfly)	<i>Boloria myrina</i>
Floater, brook (mussel)	<i>Alasmodonta varicosa</i>	Lampmussel, eastern (mussel)	<i>Lampsilis</i>

Floater, green (mussel)	<i>Lasmigona subviridis</i>	Lampmussel, yellow (mussel)	<i>Lamps</i>
Satyr, Mitchell's (butterfly)	<i>Neonympha m. mitchellii</i> **	Mucket, tidewater (mussel)	<i>Leptod</i>
Skipper, arogos (butterfly)	<i>Atrytone arogos arogos</i>	Pondmussel, eastern (mussel)	<i>Ligumia</i>
Skipper, Appalachian grizzled (butterfly)	<i>Pyrgus wyandot</i>	White, checkered (butterfly)	<i>Pontia</i>
Wedgemussel, dwarf	<i>Alasmidonta heterodon</i> **		
**Federally endangered or threatened			

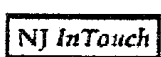
MAMMALS	
Endangered	
Bat, Indiana	<i>Myotis sodalis</i> **
Bobcat	<i>Lynx rufus</i>
Whale, black right	<i>Balaena glacialis</i> **
Whale, blue	<i>Balaenoptera musculus</i> **
Whale, fin	<i>Balaenoptera physalus</i> **
Whale, humpback	<i>Megaptera novaeangliae</i> **
Whale, sei	<i>Balaenoptera borealis</i> **
Whale, sperm	<i>Physeter macrocephalus</i> **
Woodrat, Allegheny	<i>Neotoma floridana magister</i>
**Federally Endangered	

FISH	
Endangered	
Sturgeon, shortnose	<i>Acipenser brevirostrum</i> **
**Federally Endangered	

List updated 9/12/02

The lists of New Jersey's endangered and nongame wildlife species are maintained by the DEP's Division of Fish and Wildlife's Endangered and Nongame Species Program. These lists are used to determine protection and management actions necessary to ensure the survival of the state's endangered and nongame wildlife. This work is made possible through voluntary contributions received through Check-off donations to the Endangered Wildlife

Conservation Fund on the New Jersey State Income Tax Form, the sale of Conserve Wildlife License Plates, and donations. For more information about the Endangered and Nongame Species Program or to report a sighting of endangered or threatened wildlife, contact the Endangered and Nongame Species, NJ Division of Fish and Wildlife, P.O. Box 400, Trenton, NJ 08625-0400, or call 609-292-9400.





Appendix F. Correspondence from NJDFW ENSP Regarding State-Listed T&E Species



## State of New Jersey

James E. McGreevey  
Governor

Department of Environmental Protection

Bradley M. Campbell  
Commissioner

NJDEP, Division of Fish and Wildlife  
Endangered and Nongame Species Program  
PO Box 400

Trenton, NJ 08625-0400

Tele: (609) 292-9400

Fax: (609) 984-1414

Visit our website at: [www.njfishandwildlife.com](http://www.njfishandwildlife.com)

March 23, 2004

Janet L. Bucknall, State Director  
APHIS Wildlife Services  
U.S. Department of Agriculture  
140-C Locust Grove Road  
Pittstown, NJ 08867

Dear Ms. Bucknall:

This is in reply to your request to the Division of Fish and Wildlife, Endangered and Nongame Species Program (ENSP) for review of potential impacts to state listed endangered and threatened wildlife species resulting from implementation of the Wildlife Services "Integrated Mammal Damage Management Program" in New Jersey.

The New Jersey Division of Fish and Wildlife (NJDFW) concurs that implementation of the proposed Integrated Mammal Damage Management Program is not likely to adversely impact state listed endangered or threatened species as long as the proposed actions are not directed specifically at these species. The division also concurs that certain aspects of the proposed action may result in a direct benefit to state listed endangered and threatened species. Specifically, mammal damage management activities that are conducted near breeding colonies of piping plovers, black skimmers and least terns have the potential to reduce mammalian predation at these sites.

If any of the proposed mammal damage management methods are targeted at any state listed endangered or threatened species, our concurrence is subject to the following conditions:

- No damage management methods that involve trapping, harassing, handling or killing any state listed endangered or threatened species may be employed without specific authorization within a NJDFW permit or written amendment to any existing permit.
- No control methods that involve significant habitat modification can be directed against any state listed species without first notifying ENSP and receiving written authorization.
- When considering the use of zinc phosphide (ZP), a primary consideration should be the potential for impacting non-target animals. These impacts can result from direct ingestion or ingestion of target species when ZP remains in the digestive tract.
- Exclusion, barriers, repellents and cultural methods can be employed without restriction.

In further review of the document I encountered some proposed management methods that might be of concern to other division staff. Specifically, "removing trees along stream banks to discourage the presence of beavers". Proposed actions such as this would be of concern to our fisheries biologists, for example.

Therefore, I would recommend that other bureaus within the division be given the opportunity to review the document for potential impacts to other than state listed species.

I wish to thank you for the opportunity to review and provide comments on this environmental assessment. If you have any questions pertaining to our comments or would like to discuss specific wildlife damage/control situations with our staff, please feel free to contact us.

Sincerely,

Michael Valent  
Principal Zoologist  
Endangered and Nongame Species Program

c. L. Niles  
K. Clark  
D. Jenkins